AILWAY LOCOMOTIVES AND CARS

unded in 1832 as the American Rail-Road Journal

Index To Volume 137 1963

*Illustrated; †Editorial; ‡Letters to Editor

D

E

F

G

N

O

P

R

S

T

AUTHORS

NEW PUBLICATIONS

PERSONAL MENTION

*Indicates Photograph

A

B

Q

R

S

T

U

V

W

Y

Z

OBITUARY

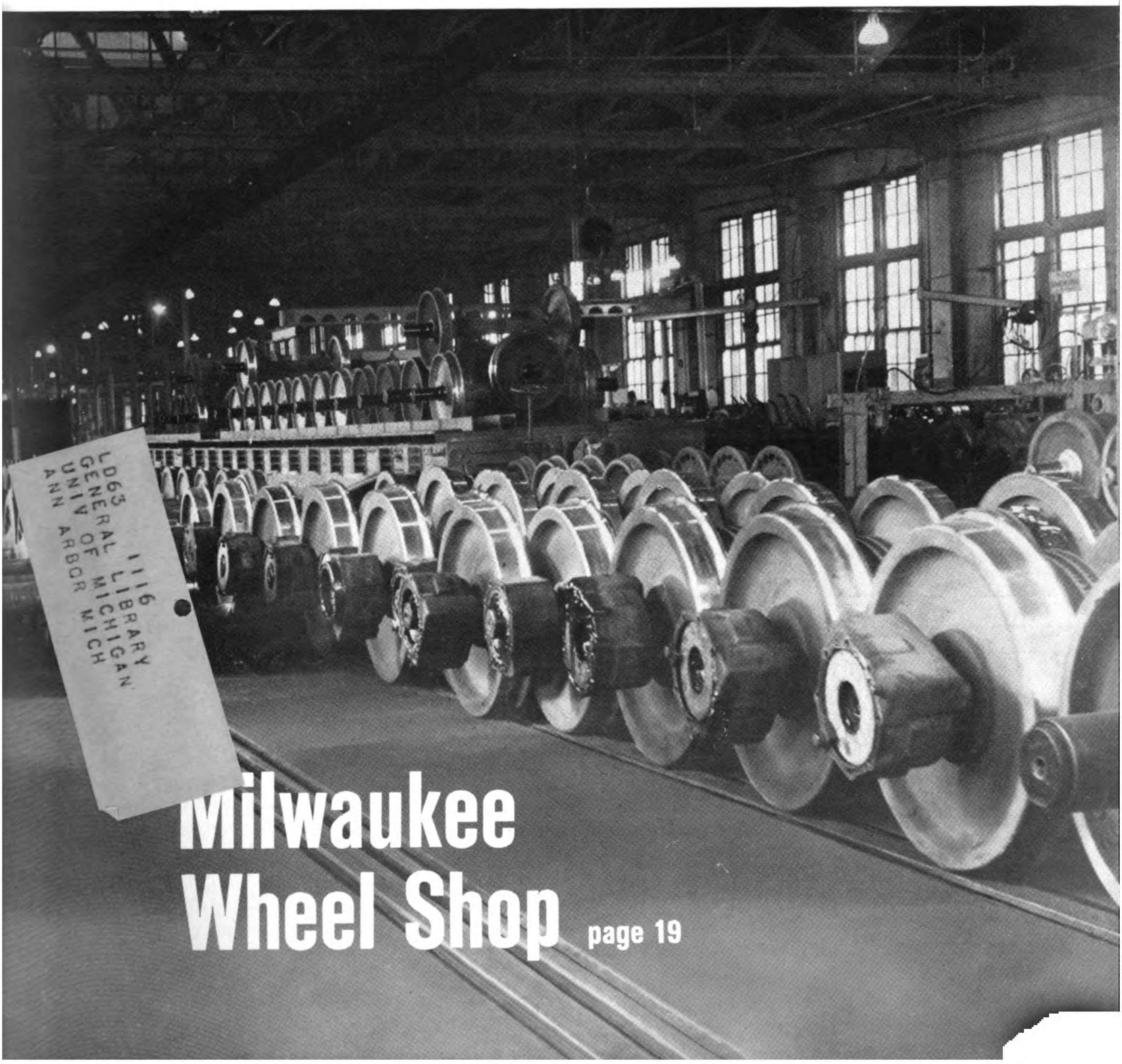
RAILWAY Locomotives and Cars

JANUARY 1963

Panel Examines Requirements of New Freight-Car Truck Design

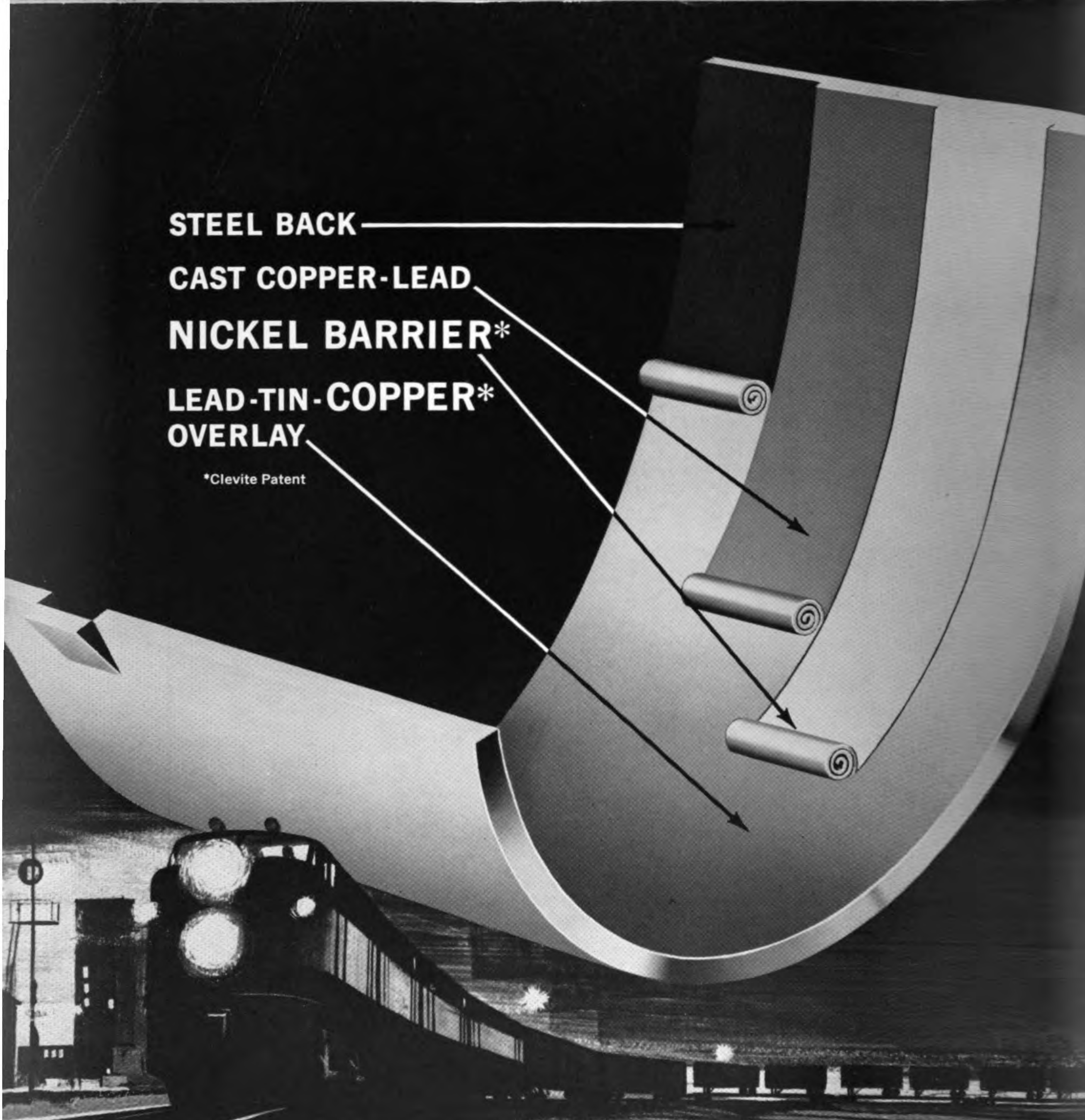
page 32

A Simmons-Boardman
TIME SAVER Publication



Milwaukee Wheel Shop

page 19



CLEVITE: New source for EMD bearing replacements

Old but new. Cleveland Graphite Bronze, world's largest maker of large engine bearings, now offers its patented heavy-duty bearing for replacements of EMD main and rod bearings.

This type bearing is *old*, produced for many years at the rate of four million a month. Yet, it's *new*, the first time this bearing has been available for use in EMD engines.

The nickel barrier stops tin migration from the overlay. It increases bearing life by enabling overlay to withstand corrosion at all times. The abrasion resistance and surface action of the overlay maintain new bearing quality at all times.

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CLEVITE

Improved — yet the cost is less! Only Cleveland Graphite Bronze can offer this improved four layer bearing. Take full advantage of this product that combines product improvement with cost reduction. For complete information, contact *Cleveland Graphite Bronze, division of Clevite Corporation, 17000 St. Clair Avenue, Cleveland 10, Ohio. In Canada: Clevite Ltd., 1177 Talbot St. Thomas, Ontario.* Also manufacturers and distributors of the Clevite Journal Bearing Cartridge.

NEW from SIOUX

AIR VALVE SEAT GRINDERS

Now, SIOUX, the leading manufacturer of valve grinding equipment brings you all the advantages of *air* valve seat grinding . . . the light weight, the power, and the trouble-free, long life. Now you can air grind with accurate, governor controlled speed.

These new advantages are combined with the proven superiority of SIOUX's Dual-Action . . . the controlled fine vibration which disperses cuttings while retaining full contact with the seat; and with the greatest possible accuracy of SIOUX Tapered Pilots.

TRADE UP TO FASTER EASIER AIR GRINDING!

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YOUR OLD SIOUX ELECTRIC VALVE SEAT GRINDER IS WORTH $20.00 AS A TRADE IN!

SIOUX AIR ANGULAR HIGH SPEED DRIVER

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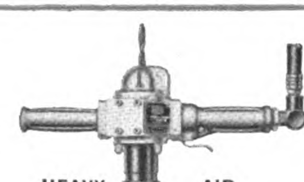
SIOUX HIGH SPEED AIR DRIVER

No. 1788, 1790. For use with valve seat grinding wheels up to 3″ in diameter.



HEAVY DUTY AIR DRIVERS

No. 1796, 1797, 1798. For use with large valve seat grinding wheels up to 6″ in diameter.

SIOUX HIGH SPEED AIR DRIVER

No. 1785, 1786. With quick release collars for use with wheels up to 3″ in diameter.

ALBERTSON & CO., INC. SIOUX CITY IOWA, U.S.A.

Valve Grinding Equipment • Portable Air and Electric Tools • Abrasive Discs

RAILWAY

Locomotives and Cars

America's Oldest Trade Paper
January, 1963—Vol. 137, No. 1

TIME SAVING IDEAS FOR JANUARY

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Report For January

IEEE Land Transport Group Presents Sperry Award

At the General Session of the Land Transportation Committee of the Institute of Electrical and Electronic Engineers on January 28, the Elmer J. Sperry Award will be presented to Lloyd J. Hibbard for his "vision and persistence in applying the ignitron rectifier to railroad motive power, simplifying and improving its utilization of commonly available electric power." Mr. Hibbard, before his retirement, was special engineer, Transportation and Generator Engineering Department, Westinghouse Electric & Manufacturing Co. (now Westinghouse Electric Corp.). The award will be made during the Winter General Meeting of the Institute at the Hotel Statler-Hilton, New York, January 28-30. The Institute of Electrical and Electronic Engineers came into being January 1 upon the merger of the former Institute of Radio Engineers and the American Institute of Electrical Engineers (RL&C, Sept. 1962, p 5).

The tentative program for the Land Transportation Committee meeting is as follows:

TUESDAY, JANUARY 29

9 a.m.

Characteristics of a Diesel-Electric Locomotive Battery Starting System — H. C. Riggs, Electric Storage Battery Co.

Locomotive Transistor Voltage Regulator — R. M. Henderson and R. Zechlin, Fairbanks, Morse & Co.

Railroad Use of Static Devices — R. K. Allen, General Electric Co.

Some Problems Encountered in the Design of Automatic Freight Train Controls (by title only)—R. G. McAndrew, General Railway Signal Co.

2 p.m.

Application of Silicon Rectifiers on Electric Locomotives in the United States—J. W. Horine, electrical engineer, Pennsylvania, and J. C. Brown, General Electric Co.

Application of the Faiveley-General Electric Type AM Pantograph to Pennsylvania Railroad Electric Locomotives — E. H. Beatty, general foreman-electric, Pennsylvania, and P. H. Baker, General Electric Co.

Silicon Rectifier Locomotive Developments in Europe—Y. Machefert-Tassin, Le Material Electrique S-W, Paris, France.

WEDNESDAY, JANUARY 30

9 a.m.

Considerations of and Operating Experience with New Adhesion Loss Detection System—H. B. Henderson, General Electric Co.

Spring Bands for Commutator Mica V-Rings — J. R. Shirley and G. Bogovich, Westinghouse Electric Corp.

Service Experience with Transistorized Control for Railroad Use—I. W. Lichtenfals, General Electric Co.

The Fundamentals of Infrared Hot Box Detection (by title only)—E. G. Menaker, General Electric Co.

(Continued on page 8)

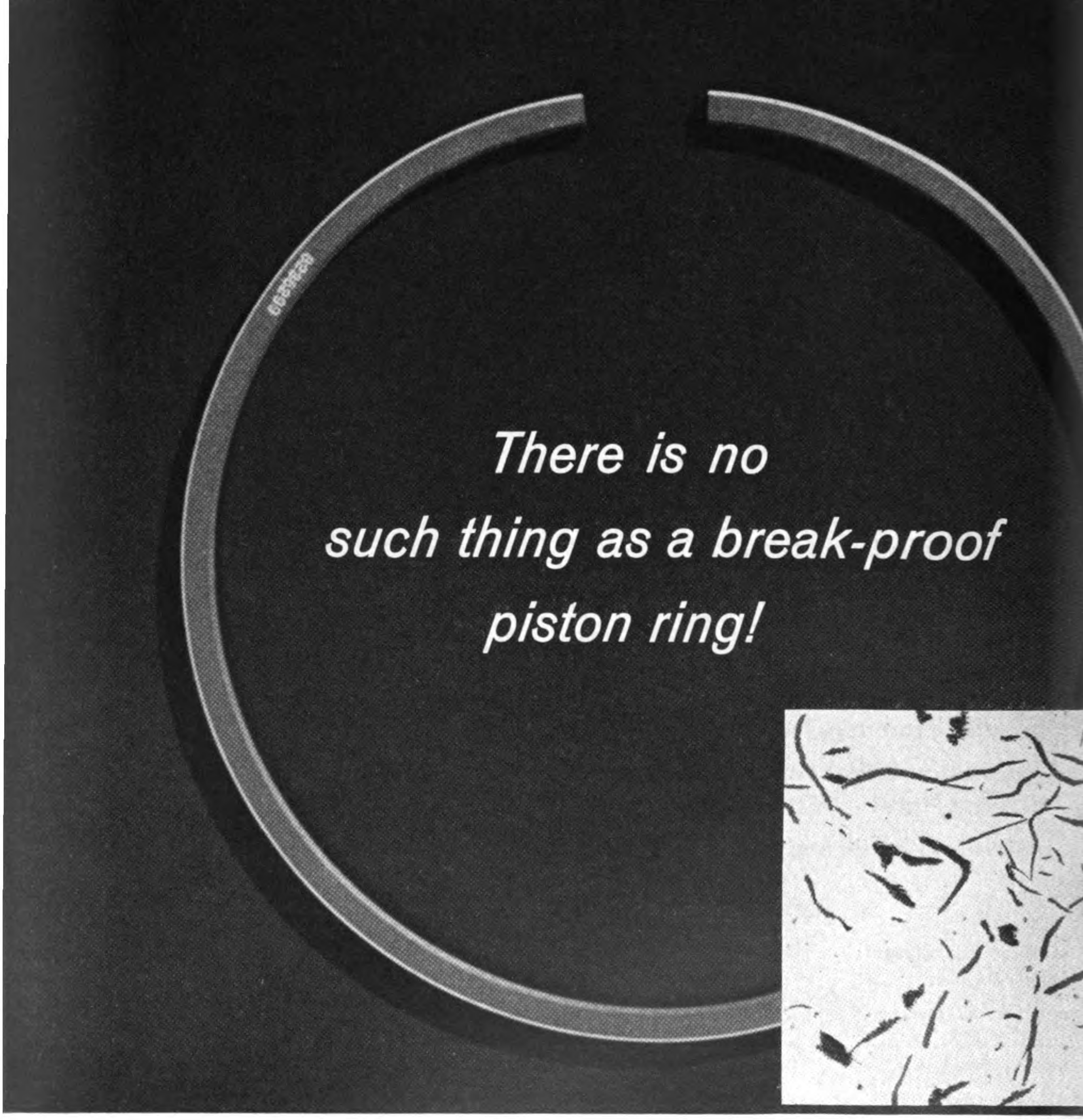


Illustration No. 1—GRAY CAST IRON
Typical graphite distribution
Original magnification 100X

Electro-Motive ductile iron piston ring stan

How do you make a piston ring that's strong, like steel, yet wears like iron—the kind you need in the top groove position?

We changed the molecular structure of the base metal. This makes Electro-Motive's Ductile Iron Piston Ring strong enough to stand up to repeated shock impact without breaking yet does not rob it of wearing quality.

Laboratory tests show that the Ductile Iron Ring has considerably greater resistanc breakage than regular cast iron, and in use Ductile Iron Ring is showing wearability wl approximates that of regular cast iron.

You can actually "see" the greater strengt Ductile Iron through micro-photography. In ular cast iron (Illustration No. 1) graphite di bution is in feathery bursts—an open invita to breakage. In Ductile Iron (Illustration No.

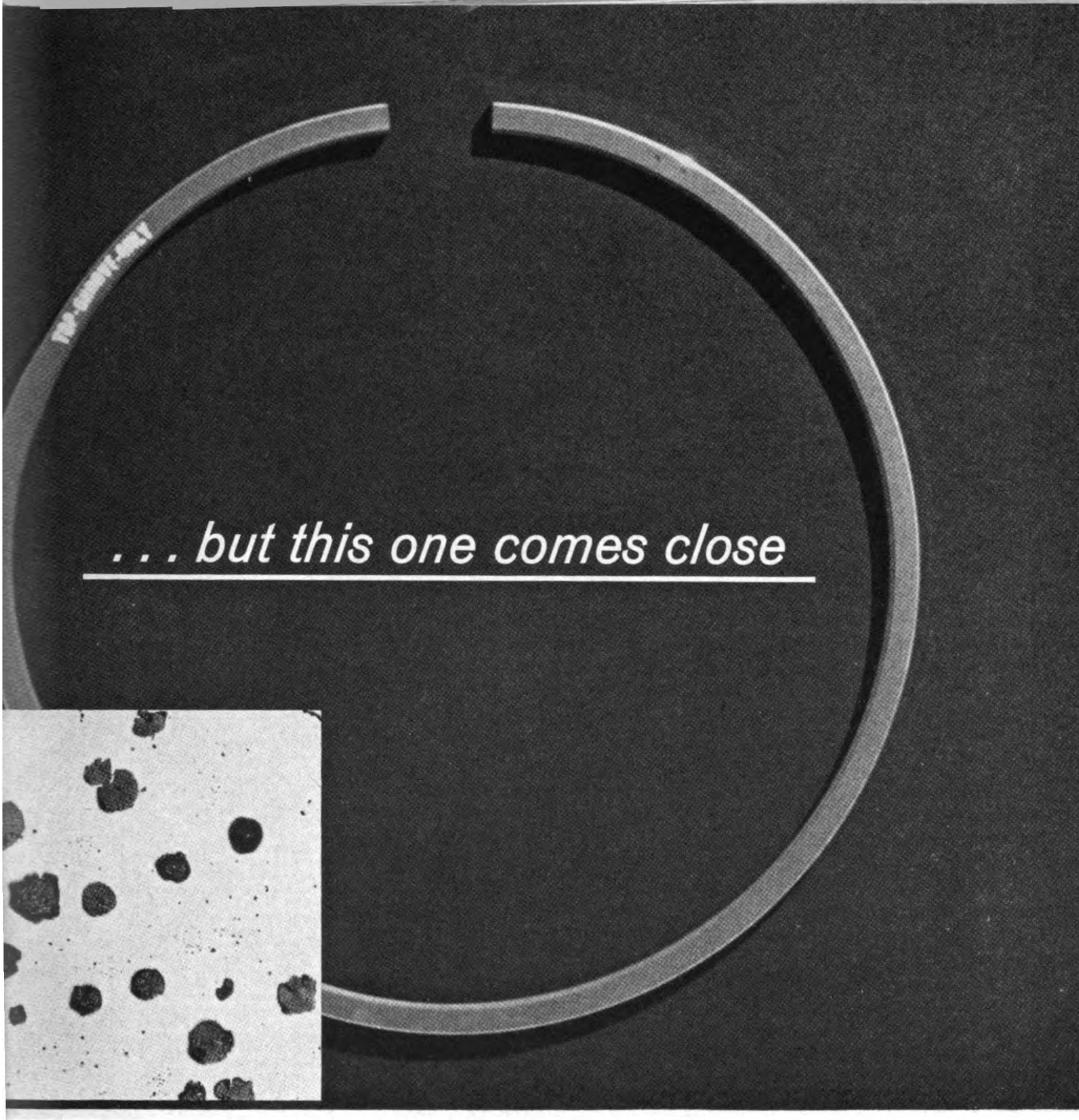


Illustration No. 2 – DUCTILE IRON
Typical graphite distribution
Original magnification 100X

p to shock impact, yet still gives good wear

graphite distribution is in nodular form, ›ring much greater resistance to breakage.
ıould all piston rings be made of Ductile Iron? necessarily. The Ductile Iron Ring is designed use in the top groove position on the piston, ›re the brunt of shock impact is felt. Electro-ive's standard cast or chrome plated rings he lower grooves will give good operational ›iency and economy.

Electro-Motive's Ductile Iron Piston Rings are for use in all General Motors Locomotives. They are available individually or in sets (chrome plated for use in cast iron liners or ferrox filled for use with chrome liners). The top groove ring in all sets is Ductile Iron.

Ask your Electro-Motive Representative to give you complete details, or write to Electro-Motive Division, LaGrange, Illinois.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel, Limited, London, Ontario

IEEE Land Transport Group

(Continued from page 5)

Toronto's Lightweight All-Aluminum Rapid Transit Cars—L. W. Bardsley, Toronto Transit Commission.

Commercial Frequency Alternating Current Electrification for a Rapid Transit System—L. G. Anderson, Chicago Transit Authority.

The New York Central Multiple-Unit Cars—John L. Swarner, Pullman-Standard.

Static Conductor Devices for Railroad Use with Particular Emphasis on Rapid Transit Cars (by title only)—W. C. Allison, Canadian General Electric Co. Ltd.

Mechanical Division Schedules Meetings in June and October

To permit completion of changes in interchange rules for 1964, the officers and committees of the AAR Mechanical Division will hold a limited business session in Chicago on June 25 and 26. Conventions of the Mechanical Division and the Coordinated Mechanical Associations—Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers—will be held in Chicago October 9 through October 16, with headquarters in the Morrison Hotel. Meetings and exhibits will be held at McCormick Place. The Mechanical Division will meet October 9, 10 and 11; the Coordinated Associations, October 14, 15 and 16.

Waste-Packed Boxes Cost More than Lubricators

Railroads lose money by operating cars with waste-packed journal boxes. This fact was brought out in a recent AAR Mechanical Division study that showed that the monthly cost of lubrication attention for waste-packed cars is $1.25, compared with $1.20 for a car with lubricating devices.

While all freight cars in interchange are required to be equipped with journal lubricating devices by Interchange Rule 3 (j) (3), there are still a substantial number of captive cars in service with waste-packed journal boxes. These cars are responsible for a percentage of the reportable hot boxes that is high and out of proportion to the number of cars so equipped. Although up-to-date information is not available, it is probable that less than 5% of the railroad and privately owned freight cars are equipped with waste-packed journal boxes. Yet the last hot box summary, dated Nov. 9, 1962, showed that cars equipped with waste and other devices were responsible for 537 or about 19 % of the 2,844 hot boxes reported for the month of August 1962. These hot boxes resulted in 918,711 miles per hot box car setoff for that month but it is believed that the record would be greatly improved if all waste-packed captive cars were to be equipped with lubricating devices.

The cost figures were based on Sept. 15, 1962 prices. For applying lubricating devices to 10-in. journals and eight journal boxes labor cost is 179 min at $5.15 per hr or $15.37, oil at $1.68, and lubricating devices at $2.35 each or $18.80 per car set, a total cost of $35.85. With a repack period for lubricating devices of 30 months the cost per month is $1.20.

For removing and replacing waste for the same journal boxes the labor cost is 206 min at $5.15 per hr or $17.65, oil, waste and rags are $4.90, a total cost of $22.55. With a repack period of 18 months the cost per month is $1.25.

Cars Orders Expected To Be Higher

A moderate increase in car orders for 1963 as compared with 1962 has been forecast by carbuilders and indicated by capital expenditure plans announced by some railroads. Preliminary figures at year end indicated that railroads and private car lines had ordered almost 35,000 cars in 1962, up about 15% over the totals for 1961. It is expected that orders will be up at least another 10% this year with order books showing about 40,000 cars by Dec. 31, 1963.

Of as great interest as the volume of car orders is the types they will include. Carbuilders predict that greatest interest wi[ll] be shown in:

- Bulk commodity cars of high capac[ity] for handling solids and liquids;
- Box cars equipped to handle read[ily] damaged ladings;
- Piggyback cars and modifications f[or] handling containers and automobiles.

"We expect that in 1963 our volume [of] railroad freight-car manufacture definite[ly] will be on the upswing over 1962," com[mented] F. H. Boland, ACF vice-presid[ent] and American Car and Foundry Divisi[on] general manager. "It is anticipated th[at] customers will continue to show increas[ed] interest in newer types of piggyback [flat] cars, cushioned underframes and other sp[e]cialized equipment such as the Center Flo[w] bulk materials handling cars. New types [of] cars and variations of existing types wi[ll] most likely continue to be developed to me[et] this demand. The trend to larger carry[ing] capacities can be expected to continue wi[th] no definite stopping point or ultimate siz[e]

(Continued on page 43)

Orders and Inquiries for New Equipment

Placed Since Closing of December Issue

Locomotive Orders

DENVER & RIO GRANDE WESTERN.—*Electro-Motive:* 15 2,250-hp diesel-electric locomotives. For February delivery.

PENNSYLVANIA.—*Electro Motive:* 52 2,250-hp diesel-electric freight locomotives. Cost, approx. $10,750,000 Delivery to begin in February and completed by end of May.

SOUTHERN PACIFIC.—*Krauss-Maffei:* 15 4,000-hp diesel-hydraulic locomotives with Maybach engines.

Passenger-Car Orders

NEW YORK CITY TRANSIT AUTHORITY. — *St. Louis Car:* 424 subway cars.. Cost, over $46,000,000. Delivery expected to begin in July 1963 and completed by May 1964.

SANTA FE.—*Budd:* 24 hi-level chair cars for "El Capitan" Chicago-Los Angeles streamliner.

Freight-Car Orders

CANADIAN NATIONAL.—*Marine Industries, Ltd.:* 200 53½-ft 70-ton flat cars of all-welded steel construction. Delivery expected in February and March.

CENTRAL OF GEORGIA.—*Greenville Steel Car:* 100 70-ton gondola cars. *General American:* 5 100-ton covered hopper cars.

CHESAPEAKE & OHIO.—*Company shops:* 500 70-ton hopper cars. Delivery to begin Feb. 1 at rate of 16 cars per day.

DENVER & RIO GRANDE WESTERN.—*ACF:* 100 50-ft, 70-ton cushion underframe box cars; *Bethlehem Steel:* 100 50-ton bulkhead flat cars. *Pullman-Standard:* 25 70-ton TOFC flat cars.

GREAT NORTHERN.—*A. A. Morrison Co. (lessor):* 550 double-door box cars. For delivery first quarter this year.

NORTHERN PACIFIC.—*Company shops:* 25 53-ft flat cars equipped with cast-steel underframes, 70-ton roller-bearing trucks, and permanent end racks. For delivery this month.

ROCK ISLAND.—*General American:* 200 50½-ft insulated box cars, to be equipped with movable bulkheads, roller bearings and cushion underframes. Cost, $3,600,000. For delivery during first quarter this year.

SOUTHERN.—*Pullman-Standard:* 500 all-steel, 70-ton Super-Cushion box cars with plug-type doors. Cost, approximately $8,825,000. Delivery to be completed in February. *General American:* 70 100-ton, 4,180 cu-ft capacity Airslide covered hopper cars. Cost, $1,536,000. Scheduled for February delivery.

UNION TANK CAR.—*Company shops:* 110 tank cars. Built in November.

WESTERN PACIFIC.—*Pacific Car & Fdry.:* 50 insulated box cars. Approx. cost, $950,000. For delivery first quarter this year.

Notes and Inquiries

Burlington will spend $20,719,000 for 1,225 roller-bearing-equipped freight cars and 12 2,250-hp GP-30 locomotives during 1963. Freight car orders will include 600 extra-wide-door box cars; 200 jumbo-size covered hoppers; 200 100-ton capacity open-top hoppers; 150 box cars with foamed-in-place insulation; 25 "damage-free" box cars w[ith] load braces and cushion underframes, and radio-equipped all-steel caboose cars.

Chicago Transit Authority's budget of $35,[...] 000 for 1963, including a carryover of $16,932,[...] from 1962 authorizations, includes $15,000,000 [for] 180 "New Look" rapid transit cars.

GREAT NORTHERN 1963 capital expenditures [in]clude $18 million for equipment acquisitions—[...] diesels; 700 50-ft, 70-ton box cars equipped w[ith] plug doors; 50 60-ft, 70-ton flat cars; 50 90-[ton] covered hopper cars; 20 70-ton Airslide cove[red] hopper cars, and 20 all-steel cabooses.

Illinois Central 1963 expenditures will incl[ude] almost $25 million for new equipment, includ[ing] 14 general-purpose diesels; 250 70-ton box c[ars] with shock-control underframes; 100 70-ton in[su]lated box cars; 350 70-ton standard-underfr[ame] box cars; 100 100-ton covered hopper cars; 50 [70-]ton Airslide covered hopper cars; 1,000 70-[ton] hopper cars; 200 50-ton and 25 70-ton flat c[ars] with cast-steel underframes; and 25 cabooses.

Milwaukee 1963 improvement budget include[s ...] million for rebuilding 3,000 40-ft and 50-ft [...] cars; $4.25 million for purchase of 16 turbochar[ged] diesels, 50 50-ft insulated box cars and 50 4,[...] cu-ft-capacity covered hopper cars. In additi[on] road will repower 30 freight diesels and sche[dule] repairs or rebuilding involving a large numbe[r of] gondola, refrigerator and other types of fre[ight] cars.

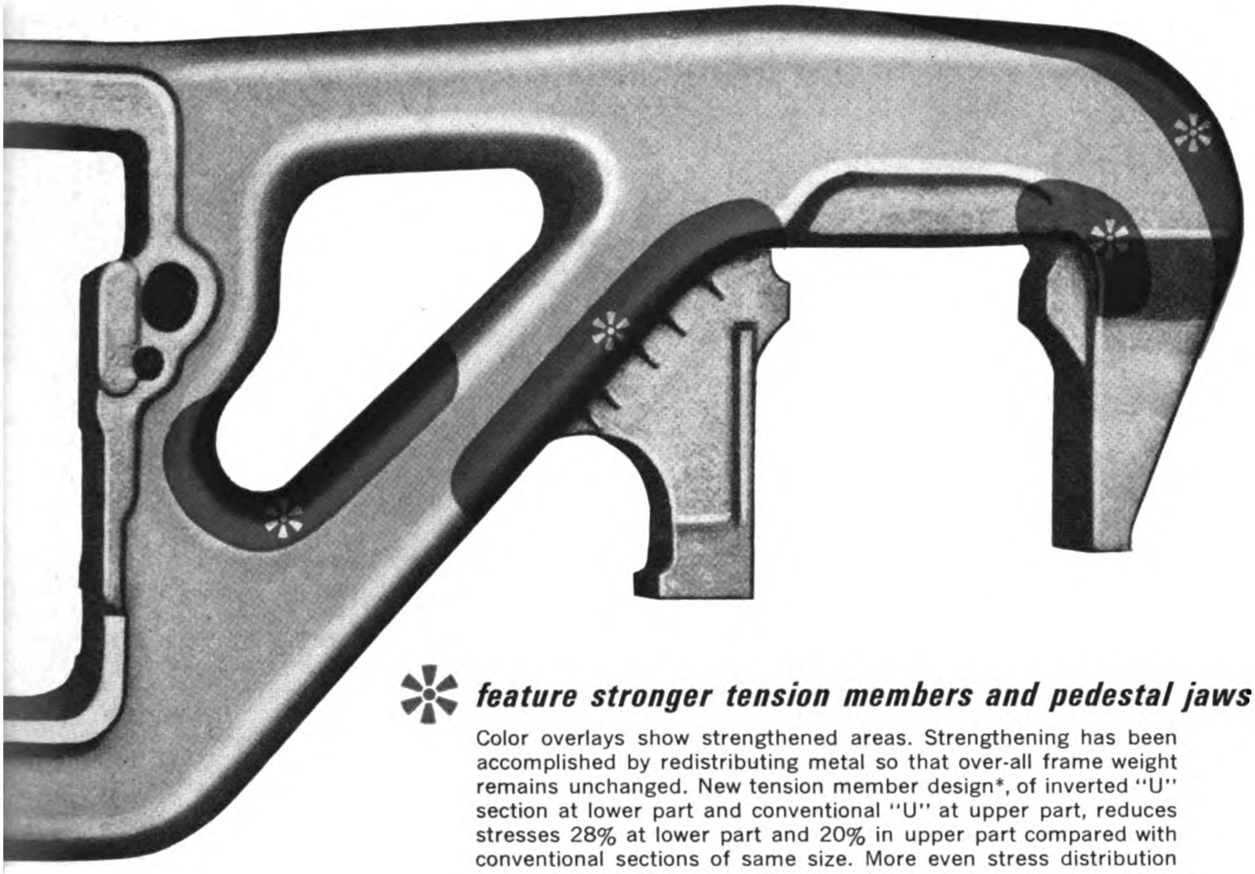
Missouri Pacific is planning expenditure of $[...] 579,000 during 1963 for the purchase of 1,100 [...] freight cars and the equipping of other cars [for] handling special lading. MP previously annou[nced] an expenditure of more than $8 million for [the] purchase of 36 1,200-hp switchers from EMD[, ...] 1,200-hp GP-18 road switchers, and 15 bagg[age] cars (RL&C, Oct., p 55.)

Santa Fe 1963 gross capital expenditures of [...] million will include acquisition of 58 new die[sels,] approximately 3,000 freight cars of various ty[pes,] 24 hi-level passenger cars (listed above); 25 s[...] lightweight baggage cars, and 6 lightweight [...] cars.

Soo-Line has approved $7.5 million for ca[pital] expenditures during 1963, including acquis[ition] of 241 freight cars and 22 GP-30 locomotives w[hich] will replace 33 diesel units being retired. Frei[ght] car orders will include 100 50-ft, 70-ton box [cars] with roller-bearing trucks and load protec[tion] devices (10 cars will have hydraulic undercush[ion]ing); 60 50-ft, 70-ton insulated box cars with [...] doors, roller-bearing trucks, hydraulic un[der] cushioning and load protection devices; 15 [Air]slide covered hopper cars; 10 70-ton multi[-]purpose hopper cars; 15 60-ft, 70-ton-capacity [...] cars with roller-bearing trucks and special [tie-]down equipment for tractors; 4 53½-ft, 70-[ton-]capacity, low-deck flat cars equipped with [hy]draulic under cushioning, roller bearings and s[pe]cial tie-down equipment for transformers; 10 [...] ft, 70-ton, roller-bearing-equipped general p[ur]pose flat cars; 10 52½-ft, 70-ton gondola cars [de]signed for steel billets, and 20 70-ton, 52[...] high-side gondolas for coal, pulpwood and s[ugar] beets.

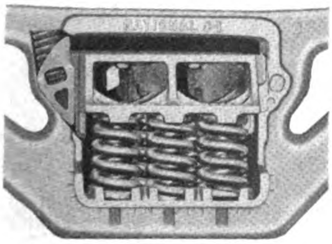
Western Pacific will acquire 80 new freight c[ars] at a cost of approximately $1,500,000. Incl[uded] are 50 insulated box cars, listed above, 20 [cov]ered hopper cars of stainless steel or alumi[num] and 10 smaller-capacity covered hopper cars.

NEW 6½ X 12 HEAVY DUTY
NATIONAL C-1 TRUCKS



feature stronger tension members and pedestal jaws

Color overlays show strengthened areas. Strengthening has been accomplished by redistributing metal so that over-all frame weight remains unchanged. New tension member design*, of inverted "U" section at lower part and conventional "U" at upper part, reduces stresses 28% at lower part and 20% in upper part compared with conventional sections of same size. More even stress distribution throughout whole frame is feature of new design. *Patented



Service-Proven C-1 Snubbing Mechanism Gives Smoothest Ride at Lowest Maintenance

The new 6½ x 12 truck is the top of the C-1 Truck line — the most desirable heavy-duty freight truck in production. Through a scientific approach to the problem of metal redistribution, it has greater strength without any increase in over-all frame weight . . . has an even stress distribution that shrugs off high impact forces.

Equally important, the 6½ x 12 C-1 shares with other trucks in the National C-1 family — the 5 x 9, 5½ x 10, and 6 x 11 — the exclusive C-1 design vertical shock snubbing mechanism — the only friction snubbing mechanism service-proven to have been right — right from the start.

No matter which National Truck you specify, you get all these important C-1 Truck advantages: Smooth ride . . . longer wear life . . . proven maintenance economy of under 5 cents per C-1 Truck in service over a 14-year period. *Or, to put it another way, about one-third of a cent per C-1 Truck per year for maintenance!*

Transportation Products Division

International Division
Cleveland 6, Ohio

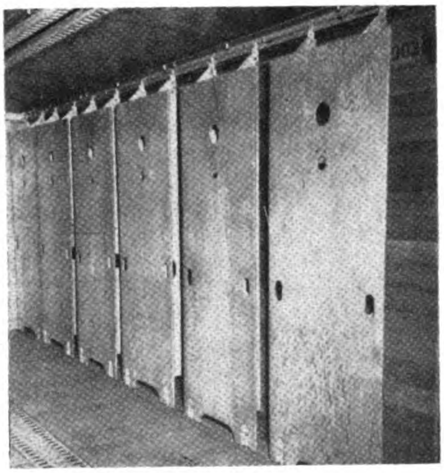
National Castings Company of Canada, Ltd.
66 Portland St., Toronto 28, Ontario

NATIONAL CASTINGS COMPANY
Cleveland 6, Ohio

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES
ROLLER BEARING ADAPTERS • NATIONAL SPEEDLOADER CONTAINER HANDLING SYSTEM

A-6754A

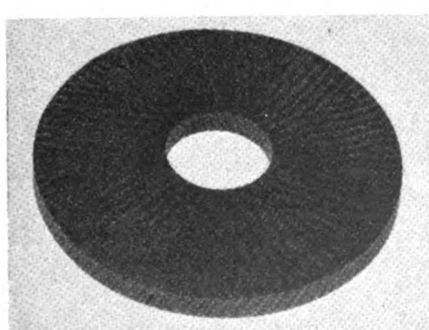
What's New in Equipment



Adjustable Panels

When locked in desired position, the Equipco 2-D side filler panels brace the sides of palletized loads along their entire length—up to and through door openings if desired. The filler can be extended as much as 30 in., and overall car width reduced 18 in. In conjunction with Equipco load divider bulkheads, the filler snugly supports lading on all four sides. The panels, fabricated of reinforced plywood, weigh 70 lb each. Normal car complement ranges from 10 to 12 units. Mounting is a one-man operation, with no bolting or welding. Union Asbestos & Rubber Co.

For more information, circle 1-1 on card following page 46.



Vibration Mounts

Two shock and vibration mounts are under test. Through the use of all-metal resilient cushions 12 in. in diameter and 1 in. thick in one test, a noticeable reduction of noise and vibration is reported in a passenger car used for testing the Met-L-Flex "center bearing" vibration mount made of compressed stainless-steel wires. Each center bearing supports one end of the car and carries a load of 100,000 lb at the truck center plate.

For the duration of another test, Met-L-Flex shock and vibration mounts are being used on a flat car to protect a 9,000-lb nuclear reactor delivered to Atomics International, Canoga Park, Calif. Robinson Technical Products Inc.

For more information, circle 1-2 on card following page 46.

Gasket Sealer

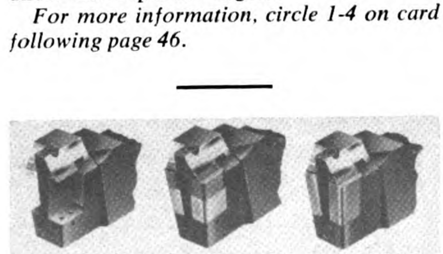
Seal-Last, a liquid type sealer for use on all types of gaskets and pipe joints, and for machined surfaces in diesel engines, is said to seal tightly, yet remain plastic to permit easy disassembly without damage to gaskets, mating surfaces, or threads. The liquid is said to resist vibration, to maintain a positive seal at temperatures from —65 to 400 deg F, and to withstand pressures to 5,000 psi. It can be used for sealing water, petroleum products, oil or water-based hydraulic fluids, L-P and natural gases, mild corrosives, and many chemicals. Crane Packing Co.

For more information, circle1-3 on card following page 46.

Battery-Powered Tools

Multi-purpose, battery-powered Impactools can be powered from any 12-volt, a-c or d-c current—a 12-volt battery mounted in a maintenance truck or portable carrier, or a 12-volt transformer plugged into a 110-a-c outlet. The tools have ½-in. square drive. Size B-4U-SD has a torque range of 75 to 95 ft-lb; size B-5U-Hd, 95 to 130 ft-lb. A 12-volt rechargeable battery pack that hooks onto a worker's belt is under development. Ingersoll-Rand.

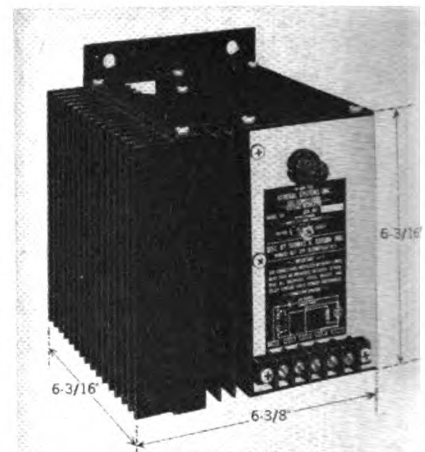
For more information, circle 1-4 on card following page 46.



Carbide Tools

Tools for wheel turning on Sellers and Niles lathes, for wheel boring tools, for hub turning, for journal turning, and wheel truing are included in a new line of carbide tools developed to cut costs in railroad shops. Either throw-away inserts or regrindable inserts (slug type) can be used in the same holder because of the use of interchangeable indexable high-speed-steel spacers. Wesson Corp.

For more information, circle 1-5 on card following page 46.



Voltage Regulator

The Model 101 voltage regulator, introduced by General Systems Inc., has no moving parts. It is designed for application to all 75-volt auxiliary generator battery systems such as those used on diesel locomotives and passenger cars. The unit will withstand operating temperatures from —40 to +185 deg F. It is 6⅜ in. wide, $6^3/_{16}$ in. long, and $6^3/_{16}$ in. high and weighs 8¾ lb. Voltage is adjustable at any point within the range of 69-70 volts. Thomas A. Edison Industries.

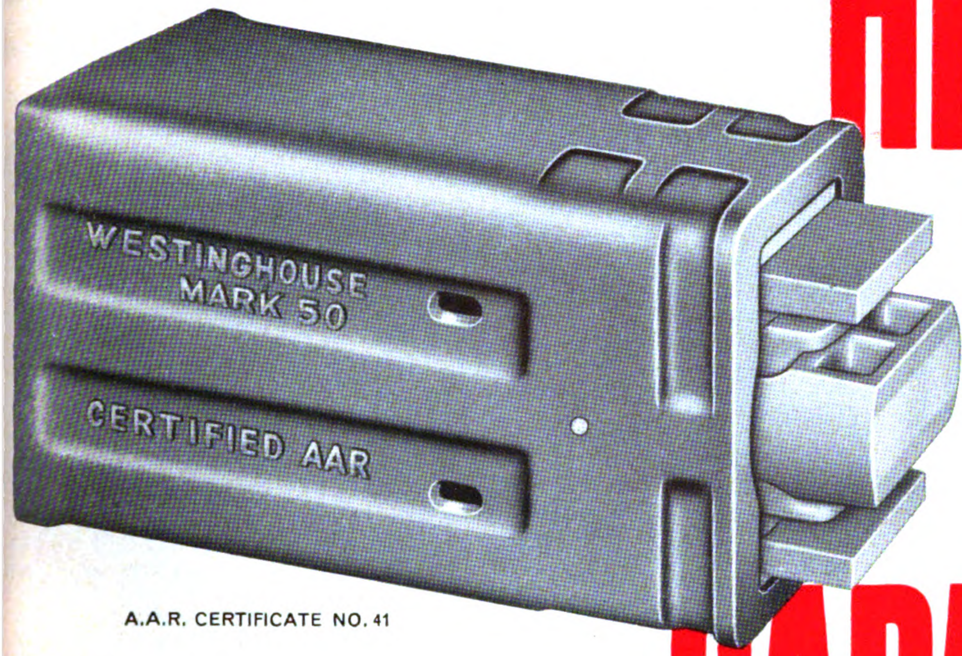
For more information, circle 1-6 on card following page 46.

Filters

The elements of the 18- or 24-in. Alsop sealed disc filter are designed to be preassembled so spare elements may be ready for quick changeovers. Housings have a working pressure of 50 psi and are available

The railroads wanted

HIGHER



A.A.R. CERTIFICATE NO. 41

- CUSHION SHOCKS
- CUT COSTLY DAMAGE CLAIMS
- PROTECT VALUABLE LADINGS
- REDUCE MAINTENANCE COSTS

CAPACITY

WESTINGHOUSE

MARK 50

FRICTION DRAFT GEAR FOR STANDARD 24 ⅝-INCH POCKETS

Cardwell Westinghouse is FIRST to meet the new A.A.R. specification!

Continually, Cardwell Westinghouse is working with the railroads to help reduce damage claims and maintenance costs.

The Westinghouse MARK 50 Friction Draft Gear was the first to meet A.A.R. Specification M901E-59, calling for a high capacity, low reaction Gear for 24⅝-inch pockets. The railroads wanted adequate capacity to cushion critical shipments. MARK 50 with 3¼ inches of travel, provides capacity over and above the A.A.R. requirements.

Let this high capacity Gear cushion and protect *your* cars and ladings against high-energy impacts. Specify MARK 50!

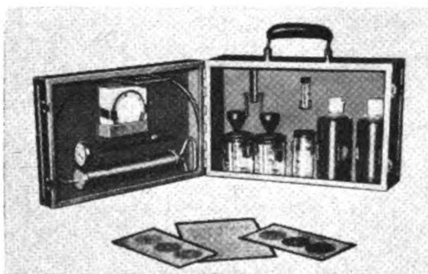
CARDWELL WESTINGHOUSE

Company

332 S. Michigan Ave., Chicago 4, Illinois   Canadian Cardwell Co., Ltd., Montreal 2, Quebec

in carbon or 316 stainless steel. Flanged inlet and outlet connections vary from 2 to 3 in. Overall height is 60 in. The complete filter is also offered as a combination unit, either portable or stationary, with type 316 stainless-steel pumps. Capacities range up to 300 gpm. Alsop Engineering Corp.

For more information, circle 1-7 on card following page 46.



Oil Test Kit

A lubricating-oil test kit to U.S. Government specification provides all tests set out by specifications MIL-T-19467 (Ships) and MIL-T-22493 (Wep.) which take in fuel dilution, water, corrosive acids. and solids. Gerin Corp.

For more information, circle 1-8 on card following page 46.

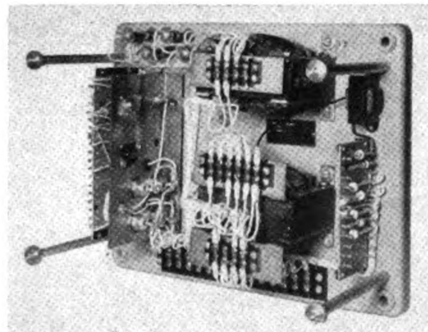
Breather Filters

For installations requiring small air flows, the "button-type" breather filter is said to protect small air vents against air-borne dust. The new model has a low profile as compared to most breathers. With male pipe thread connections, sizes range from ⅛ to ¾ in. Air-Maze Div.

For more information, circle 1-9 on card following page 46.

Brushless Generators

Polarity reversing switches, commutators, brushes and brush gear have been eliminated in variable speed generators and genemotors designed to replace existing d-c generating equipment on passenger cars and cabooses. The brushless machines embody an exciter with the alternating current carried to the rotating silicon diodes for rectification, this being fed directly to the generator's rotating field. Stator output is rectified, supplying direct current for battery charging, car lighting and other purposes. The machines are supplied as 2-kw, 3-kw, and 10-kw generators to be used either with a belt-drive suspension or for body mount-



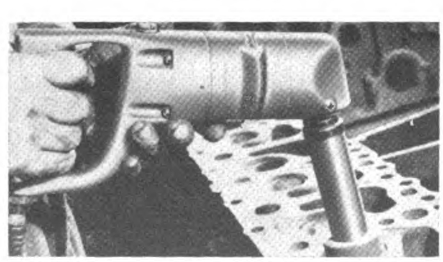
ing with Spicer drive. As genemotors they are available in 25-kw and 35-kw ratings. All fall within overall diameters and lengths of previous equivalent equipment, minimizing the problems involved in changing from the older equipment. The 3-kw equipment is specially designed for low cutting speeds and high top speed, making it suitable for caboose applications. Maintenance requirements are further reduced by the static control package supplied with each of the machines for voltage regulation and current limit. Safety Electrical Equipment Corp.

For more information, circle 1-10 on card following page 46.

Air Dryer

As air passes through the Binks compressed air dryer, entrained foreign matter and moisture collects in the dryer accumulator, providing the mechanical separation. The air rising upward through the dryer passes through a chemical desiccant in bead form. The beads attract and collect suspended vapors from the air and, as they reach the saturation point, the beads slowly dissolve and give off a light mist. The mist attracts the remaining dust particles from the air, and these particles fall to the accumulator section for later removal. Air then passes to the dryer outlet, ready for use. Outlet air is as low as minus 20 deg F dewpoint. The dryer is recommended for use with regular compressed air system aftercoolers and oil and water extractors. Models range in capacity from 13 to 12,000 cfm, rated at 100 psi. Binks Manufacturing Co.

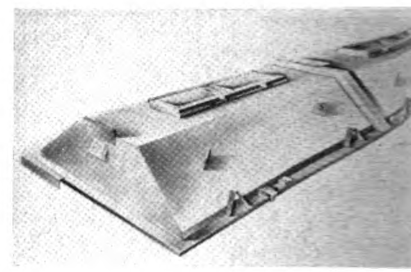
For more information, circle 1-11 on card following page 46.



Air Drivers

Grinding wheels from 2½ to 6 in. capacity can be accommodated in the new line of Sioux air drivers for valve seat grinding. A lightweight air motor, controlled by a governor, drives the grinding wheel at a constant speed. Cuttings are automatically and continuously dispersed while the grinding wheel is in full contact with the valve seat. The line includes angular high-speed air drivers with a 15 deg angle drive, straight drive high-speed air drivers with or without quick release collar, and heavy duty air drivers with quick release collar. All motors are rated at 1 hp, except the heavy duty models which use 1¾- and 2-hp motors. Albertson & Co.

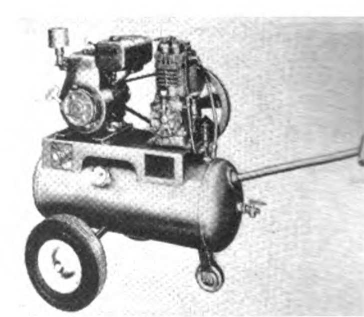
For more information, circle 1-12 on card following page 46.



Car Cover

A three-section, general purpose car cove eliminates the need for equipping cars wi various types of single-purpose hoods an for building up car sides to accommoda special cargo. It is equipped with hatche and can be used on open-top hopper car The cover is of all-steel welded constructio and leakproofed. Ventilation at both end eliminates condensation. Shunk Manufa turing Co.

For more information, circle 1-13 on ca following page 46.

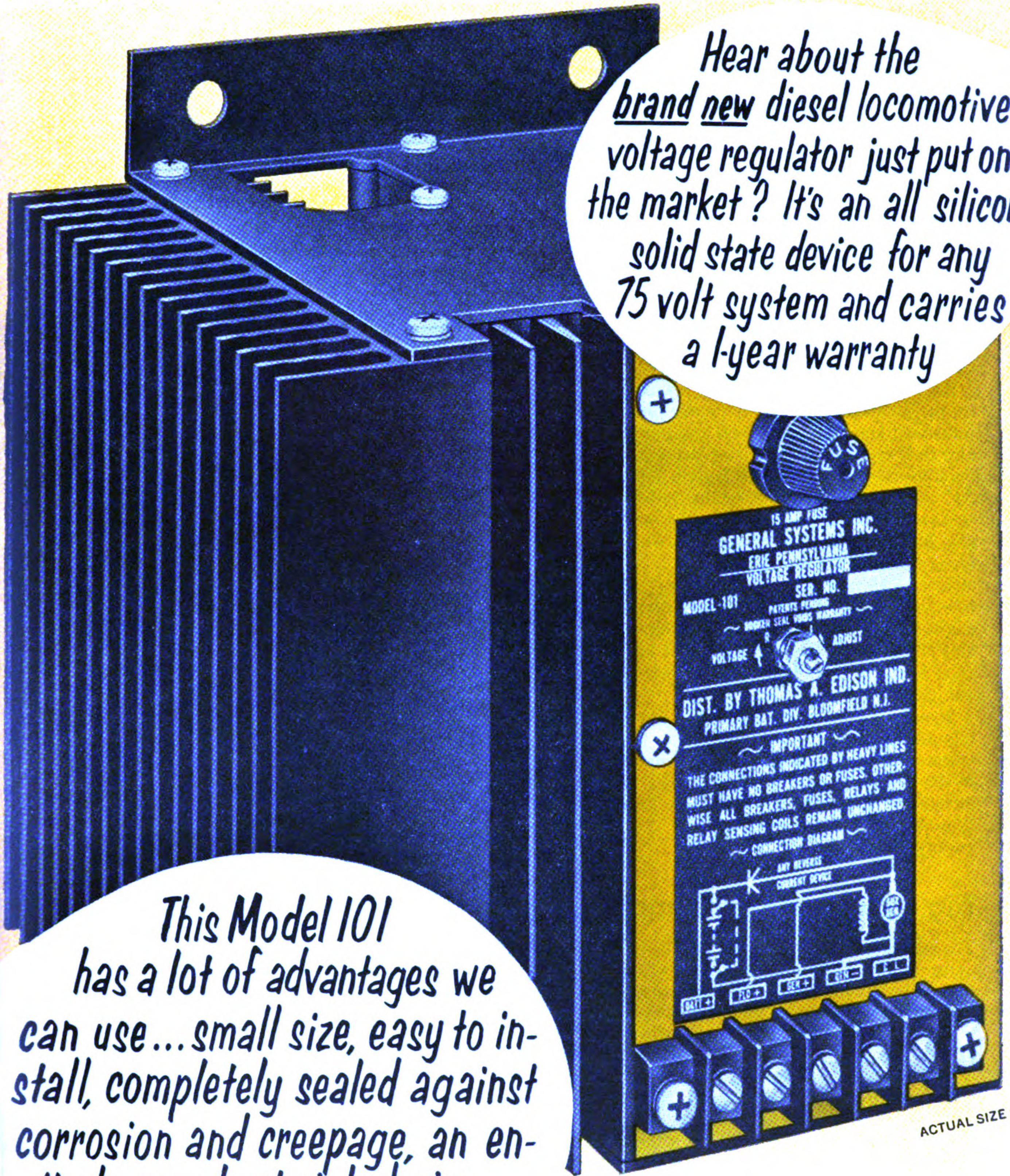


Air Compressors

The Model 33-1140 air compressor featu a 1½-hp electric motor drive; the Mo 33-1141, a 4-hp gasoline engine drive. Bo units are designed for use with air-atomiz or airless spray painting equipment, pne matic tools, or as a compressed air sup source. They are equipped with a consta speed unloader, pressure-lubricated tw cylinder air compressor, drive belt adju ments, safety-valve, tank drain, air-press gage, and on-off air outlet valve. The elect model supplies 6 cfm at an operating pr sure of 100 to 110 psi. The gasoline-engi driven model delivers 6.7 cfm at an op ating pressure of 100 to 110 psi. Worki pressure of the 15-gal tanks of both mod is 200 psi. Binks Manufacturing Co.

For more information, circle 1-14 on c following page 46.

Hear about the __brand new__ diesel locomotive voltage regulator just put on the market? It's an all silicon, solid state device for any 75 volt system and carries a 1-year warranty



This Model 101 has a lot of advantages we can use... small size, easy to install, completely sealed against corrosion and creepage, an entirely new heat sink design— and this one unit fits __all__ applications

If this is interesting news to you, too, get all the facts by writing Thomas A. Edison Industries, Primary Battery Division, Bloomfield, N. J.
Just ask for Bulletin PB 1099.

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McGRAW EDISON

Editorials

Why Wait?

Many non-interchange, or so-called captive, freight cars, are still operating with waste-packed journal boxes. Owners of these cars may believe that they are saving money by not changing over to lubricators, but a recent AAR Mechanical Division study, reported elsewhere in this issue, shows that lubrication costs alone are higher per car per month for waste-packed cars than for lubricator-equipped cars ($1.25 vs. $1.20).

This cost does not include the operating losses incurred by the greater number of hotboxes produced by waste-lubricated journal boxes. Such losses are substantial, and also each avoidable hotbox is a potential cause of a serious derailment. The last AAR hotbox report showed that 537 of the 2,844 hotboxes reported for September 1962 occurred in waste-packed boxes. In other words, probably less than 5% of the freight cars were responsible for about 20% of the hotboxes.

It is mandatory that all plain bearing cars in interchange be equipped with journal lubricating devices. These lubricators have done an outstanding job in reducing hotboxes and producing a record in 1962 that was about twice as good as the average 1961 monthly performance of 394,446 miles per hotbox.

If all plain bearing freight cars were equipped with lubricating devices, it is probable that the miles per hotbox would average over a million per month. In the light of the AAR cost study, good business judgment should dictate the swift completion of this conversion project. Why wait when better performance can be obtained at lower cost?

Big Power Maintenance

The railroads are getting bigger and more powerful diesel units. In 1962, approximately 80% of the orders for the 673 units reported were of 2,000 and more horsepower By the end of 1962, about 25 railroads had diesel units in this horsepower range, and the list will continue to grow as deliveries are made in 1963. More and more railroads will be interested in the maintenance procedures and problems that are pecular to these newer diesels packing more power in one package.

This subject is considered of such importance that the top motive-power maintenance men have set up the major part of a convention program to deal with all maintenance aspects of the more powerful units. The Locomotive Maintenance Officers Association has assigned five of its seven technical committees the task of developing information on the subject for presentation at the annual meeting on October 14-16 during the big convention at Chicago. Topics of the five committee reports, all dealing with higher horsepower diesel units, include fuel and oil requirements, effects of higher horsepower on electrical equipment, comparative analysis of engine maintenance, shop facilities, and maintenance of mechanical equipment other than engines.

All the new models have incorporated new developments that produce either operational or structural advantages over older locomotives. These developments in engines, running gear, auxiliaries and controls may require a revision in maintenance methods and procedures. Even physical dimensions could result in changes in current shop facilities where increased lengths affect spot systems, or in planning for future maintenance shops and servicin properties.

With a fluid locomotive situation, planning for maintenance is important and requires foresight. The new motive-power units have operating and economic advantages, yet they impose new problems on the men that hav to keep them operating. Not only will maintenance offi cers have to deal with the models now available, but the may have to handle even more powerful units as unofficia sources report than an 85-ft, 5,000-hp design has bee ordered from one major builder.

The LMOA program will be of great value to the rail roads that now have, or will have, the higher horsepowe diesel units. It will guide maintenance men in plannin how to keep the more powerful units of the future avail able for utilization.

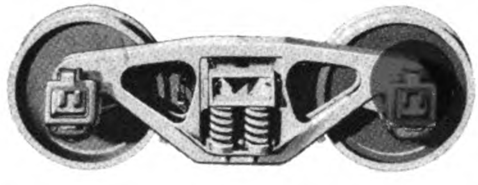
Insuring Car Supply

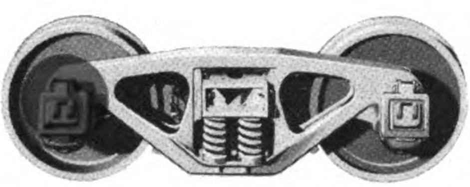
Statistics can be boring. As a matter of fact, we heard th treasurer of a large corporation say recently that, if a statisticians were laid end to end, that would be just wha they deserve. However, without going into a lot of figure the record shows that the freight-car fleet is declining i numbers and the all-purpose box car supply is going dow at a much faster rate than the total fleet. The supply o these box cars is so low that the shortage of good cars o this type suitable for grain loading has caused a tran portation bottleneck in the mid-west.

The serious situation in the grain states and a possib solution to the shortage were discussed by Eldon Marti vice-president, Chicago, Burlington & Quincy, before t Mid-West Shippers Advisory Board, Chicago, last N vember 27. He said that, even as he spoke, "hundre of grain elevators are blocked for lack of cars and mi lions of bushels of grain are stored on the ground at ra road stations."

As a solution, Mr. Martin said sound economic princ ples would go far toward getting an adequate nation supply. He recommended a two-pronged attack. Fir fix all per diem charges at a level that would make c ownership attractive and profitable to the car owner. Se ond, divide the national car fleet in groups with a differe per diem for each group. Instead of the current $2.88 p day which applies to all cars regardless of age, conditi or value, he suggests four or five charges ranging fro $1.50 for a worn-out "klunker" to possibly $7.00 for new, efficient car built to serve the shippers' needs mo efficiently and economically.

The variable per diem idea is not new but makes n less sense because of this fact. Mr. Martin believes would produce the desired results in getting an adequa supply of cars. We agree that it would be an incentive t build more good cars, cars like the trough-hatch covere hopper, described in this issue, that was built specifica for grain.





WHICH ONE IS HOT?

You can never be sure without SERVOSAFE® Hot Box Detectives*

Ironically, many of the measures directed toward *preventing* hot-boxes have the secondary effect of making them harder to detect by ordinary visual and manual inspection when they do occur. Improved lubricants withstand higher temperatures before breaking down and releasing tell-tale smoke. Lubricator pads, admirable successors to waste packing in most respects, are less subject to smoking and ignition. Roller bearings, with their fine record of performance, give virtually no warning short of burnoff when they do fail. Add to these problems of detection the greater speeds and heavier loads of the modern freight train and it is no wonder that derailments due to hotboxes continue to mount despite the most careful inspection procedures.

Long before a faulty bearing or journal begins to reveal its condition to the eye or hand, events take place within the journal box which are readily detected by a SERVOSAFE® system. An ultra-sensitive, high speed infrared element "looks" at the same area on all passing journal boxes, regardless of speed, and reacts individually to the heat radiating from each one. These responses are converted to electronic signals which are amplified and mechanically recorded to give a permanent record of all journals on the train. Hotboxes—even those that are just *beginning* to overheat—are easily identified by high "pips" on the SERVOGRAPH® chart. These pips are not measurements of temperature but relative indications of overheating, using the normal average of the other journals as the reference standard, plainly visible on the same chart. The SERVOSAFE® system is not intended to *replace* conventional inspection but, rather, to *supplement* it—with a degree of certainty and reliability not possible to achieve by visual and manual means alone.

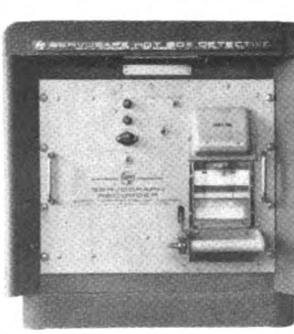
Inspectors on roads equipped with SERVOSAFE® Hot Box Detective systems *know* when a journal is running hot. They are informed of its location, even before the train reaches the yard. When the train pulls to a stop, inspectors concentrate their attention on the "suspects"...take corrective action *before* damage occurs. And chances of a faulty bearing leaving the yard, with burnoff and derailment a possible consequence, are reduced to an absolute minimum.

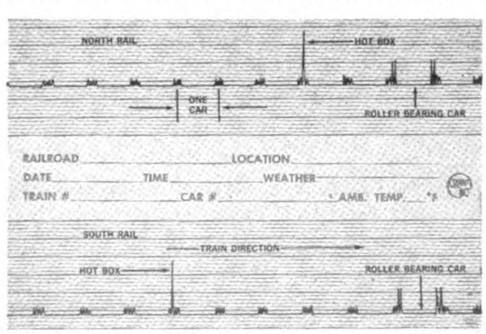
Servo hotbox specialists will gladly study your requirements. Why not get together with them soon and blueprint your own selective maintenance program.

Railroad Products Division

SERVO CORPORATION OF AMERICA • *111 New South Road, Hicksville, L. I., N. Y. • WElls 8-9700*

***Protected under one or more of the following U.S. Patent Nos.: 2,880,309, 2,947,857, and 2,963,575. Other U.S. and foreign patents pending.**





SERVOSAFE® Hot Box Detective® systems inspect all passing journals of incoming trains . . . furnish yard crews with advance information on hotbox locations for reliable, economical selective maintenance.

SP whips car-end straightening with 50-ton hydraulic head on Rotobooms

Southern Pacific is the first transportation system to use new John Deere Rotoboom car-end straighteners. In fact, S.P. instigated the development of the new Rotoboom attachment by making their needs known to us.

The highly mobile hydraulic rams roll to the job on tractor power straightening the ends of coupled cars where they stand.

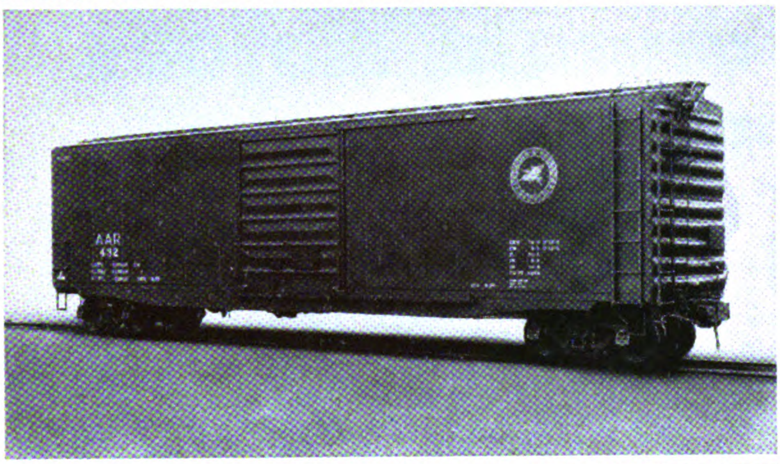
The power head is equipped with a working tool on one end, pads on the other, enabling operator to work on either car in turn. Head rotates hydraulically up to 210 degrees. Entire boom can be swung in one full circle around the tractor, and is raised, lowered, or extended as required to work the tool from left to right and top to bottom. One man does the job in ten to fifteen minutes.

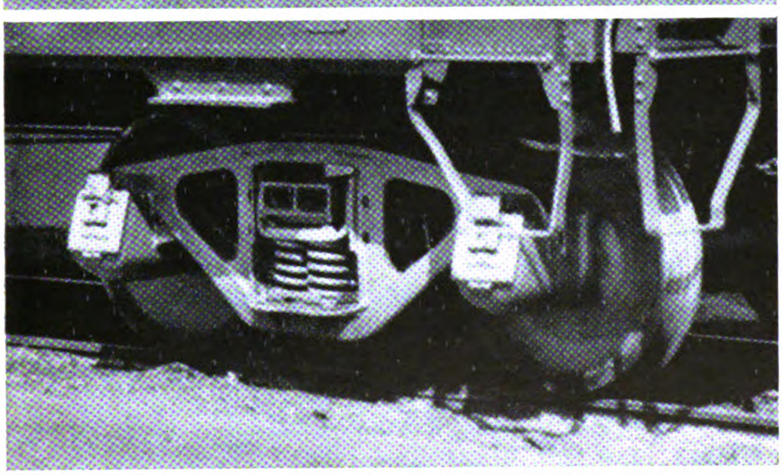
Operator can also place the three-cylinder ram vertically on the ground, slide it under cars as a jack for changing wheel-truck springs. Hydraulic working pressure is 2000 psi, developing capacity of 50 tons. Rotoboom is detachable, freeing tractor-loader for use in loading or cleanup work. The Rotoboom also mounts on John Deere crawler tractors.

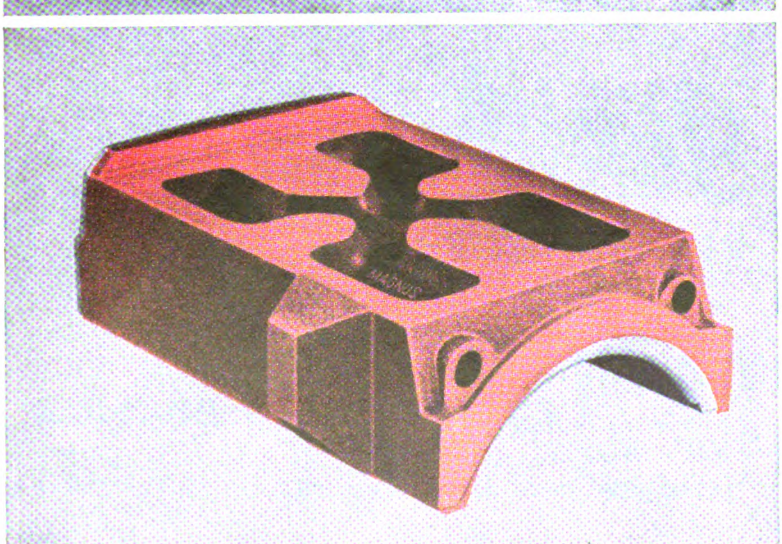
For details, see your dealer listed in the yellow pages. John Deere, 3300 River Drive, Moline, Illinois.

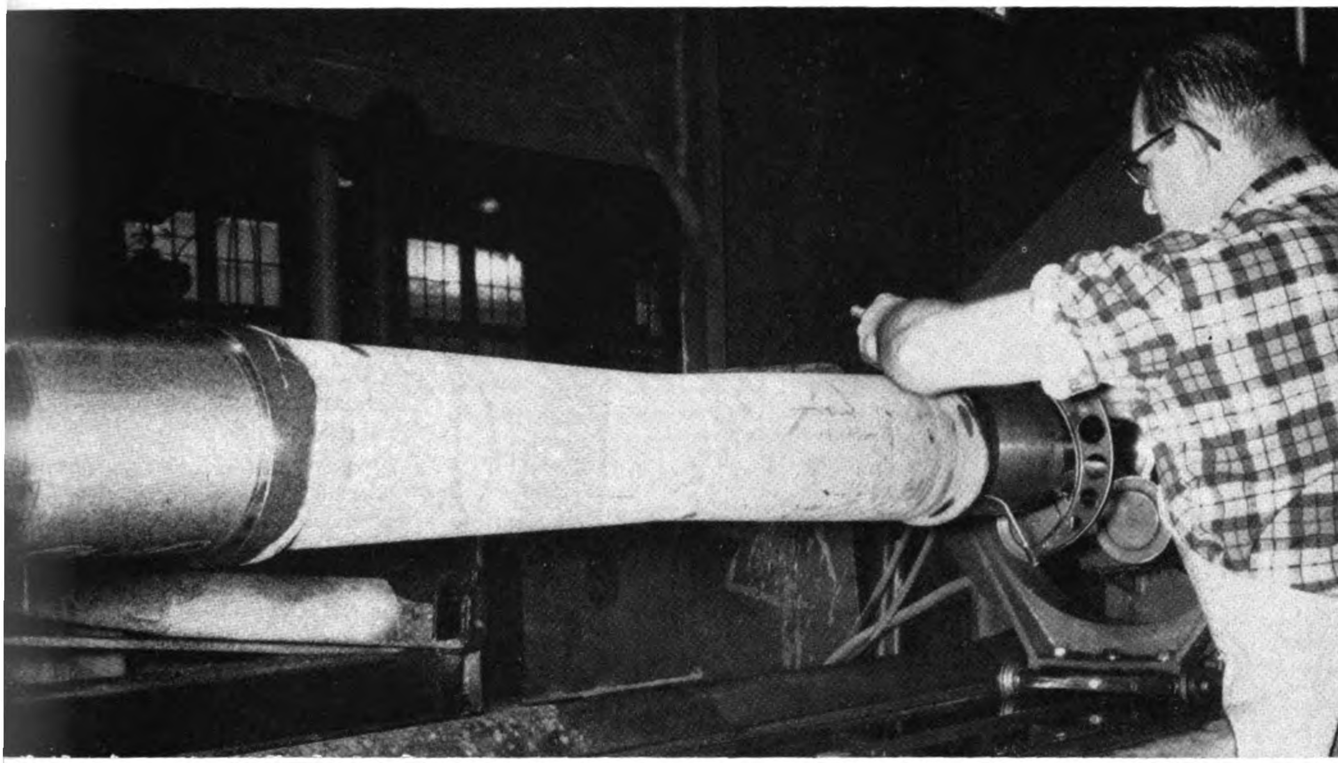
JOHN DEERE

LOADERS
MOWERS
AND
MAINTENANCE
EQUIPMENT









Manual measurement of wheel seats is standard shop procedure. Some seats are then measured by sensing device for setting automated boring machine.

Shop Fills Milwaukee Wheel Needs

Locomotive- and car-wheel requirements for system handled by facility now partially automated

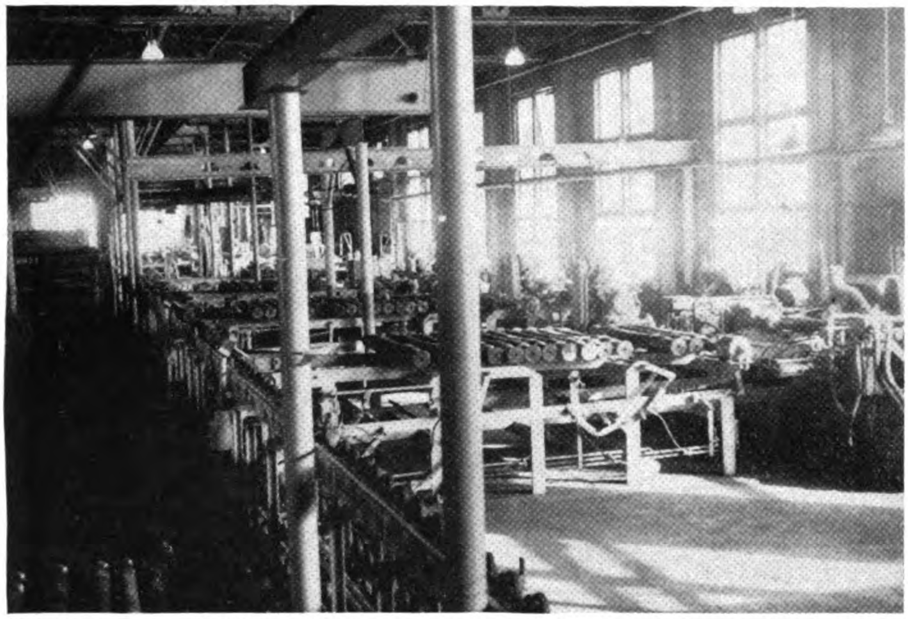
All freight-car, passenger-car and iesel-locomotive wheels and axles for ıe Milwaukee system are processed in ıe wheel shop at Milwaukee, Wis. 'roduction lines for new and reconitioned wheel assemblies turn out an verage of 2,400 freight-car, 100 iesel-locomotive, and 80 roller-bearıg passenger-car wheel sets monthly. ıxle production operations are semiutomatic, with axles handled autoıatically to the lathes and Magnaglo. /heels are mounted manually. A ›rce of 54, including machinists, helprs, and two laborers, operate the failty on two shifts, five days weekly.

On the automatic axle production ne the electronic and electrical equipıent at the sizing station, which transmits axle size data to one boring mill for automatic machining, has been furnished by Baldwin - Lima - Hamilton. All other equipment, including automatic controls, roller conveyors, axle transfer racks, time delay relays and pneumatic equipment, was engineered and installed by the road's mechanical forces.

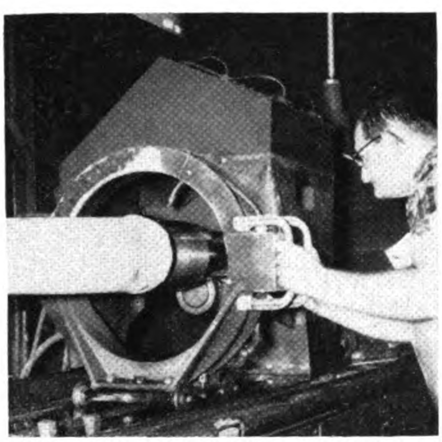
Wheel cars are switched into the east end of the longitudinal shop on a center track and are unloaded on adjacent storage tracks at the south side. Finished mounted wheels are loaded from the north side. One storage track leads to the demount press, the initial operation on the production line.

All wheel sets brought into the shop are first inspected for defects to determine whether they will be demounted or will receive only tread and journal attention. Those for stripping are rolled to the demount press. After the wheel set is positioned over the press, a pushbutton control actuates the stripping operation. The wheel set is dropped below floor level into the press. A ram on each side, in turn, presses each of the wheels off, and the wheels and axle are returned to floor level.

Scrap wheels and axles are moved to a bin outside the shop and loaded by magnet into a scrap car. An electric hoist places axles for reconditioning on the top deck of the axle conveyor which parallels the production line. Wheels held for reboring and



Transfer racks at axle lathes hold axles for journal machining. One lathe at a time is supplied from the conveyor system (left). Loading and unloading of racks is remotely controlled.



Wheel fit is examined by Magnaglo for defects. All axles are checked following machining.

remounting are stored outside the shop, from where they are moved by forklift to a storage adjacent to new wheel supply when needed. Four men at the demount press strip 200-wheel sets in 8 hr. Press operations are being studied for further automation, with particular emphasis on conveyor loading and rapid disposal of scrap wheels and axles.

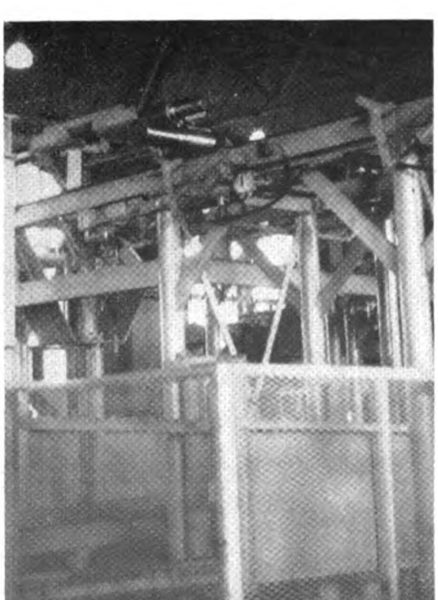
Wheel sets requiring tread or journal attention are moved from the south to the north bay of the shop. Along the north wall, as the wheel sets move from east to west, are two Sellers lathes, one for turning scored or overheated journals and, the other, a tracer lathe for restoring wheel tread contours. The finished wheel sets are then placed on the adjacent track where they roll by gravity back to the wheel car for loading. A King boring mill is available for facing gears and turning hubs for Budd disc brakes on passenger-car wheel sets.

The conveyor system for axles runs continuously at 3 ft per min, controlled by a master panel at the demount station. Axles are supplied automatically from the top deck of the conveyor to the top transfer racks at the lathes. One lathe is supplied at a time.

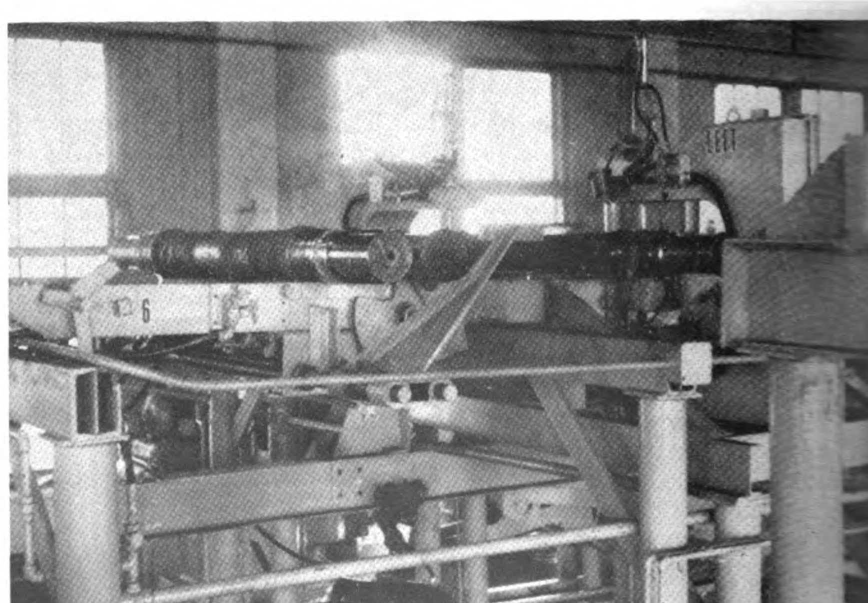
Separate Controls

Each rack is controlled by a separate pushbutton on the master panel which initiates operation of an electric eye at the junction of the rack and conveyor. As the axle on the conveyor breaks the light beam from the photoelectric cell, the current setup actuates a relay which operates a trigger in the conveyor mechanism to unload at the transfer rack. Finished axles from the lathe are returned to the bottom of the transfer rack. A separate pushbutton loads these axles onto the conveyor's lower deck for movement to the Magnaglo.

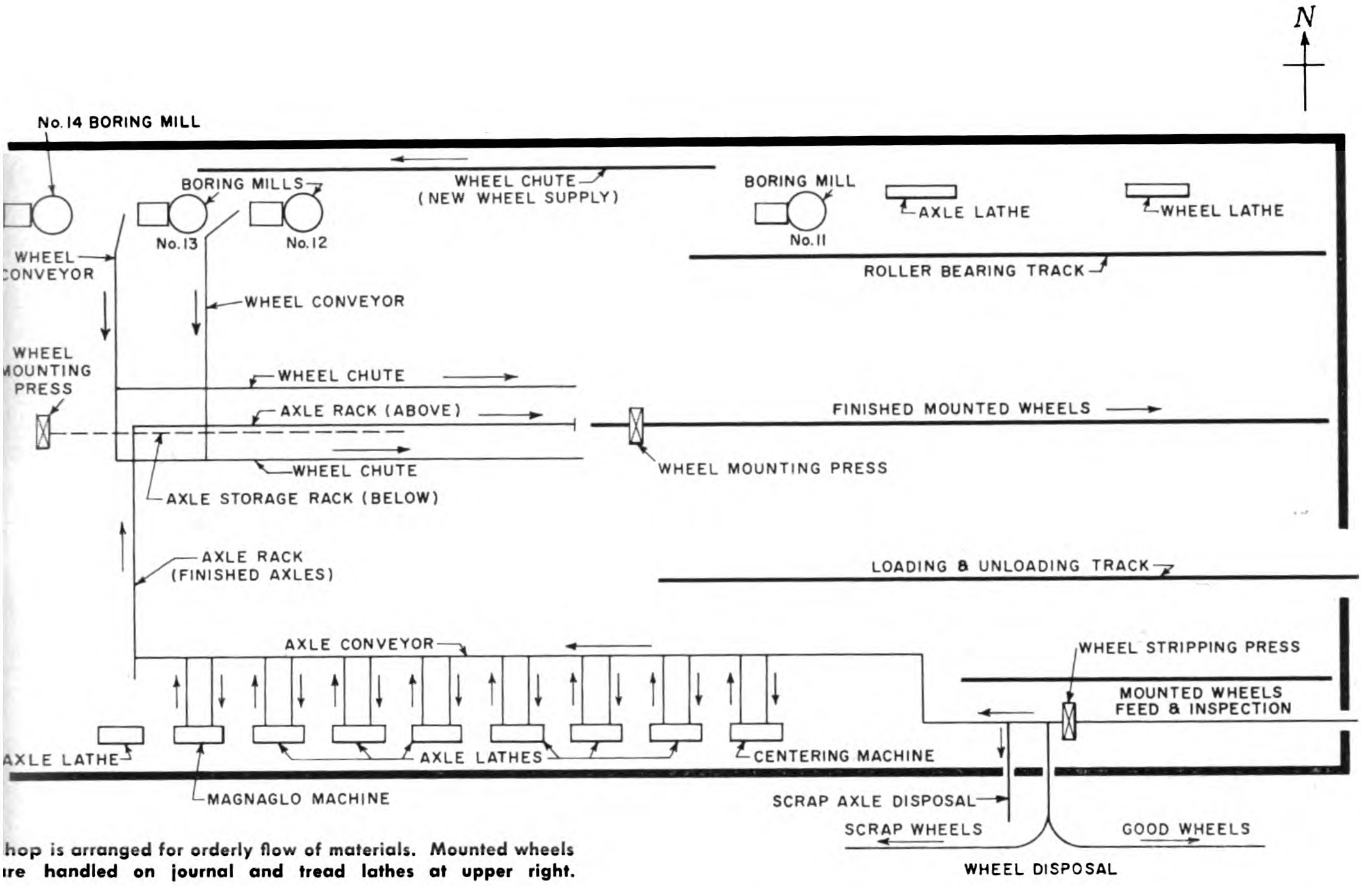
Along the south wall of the shop parallel with the axle conveyor, are four Sellers axle lathes, one Magnaglo, one Sellers tracer axle lathe, and a Niles axle lathe. The tracer lathe used for producing new roller-bearing axles automatically, is also manually



Stops on rack crossing aisle check movement of axle to elevator, on which axle is turned 90 deg.



Probes at sizing station transmit axle size electronically to Mill 13 which is equipped for the automatic boring sequence.

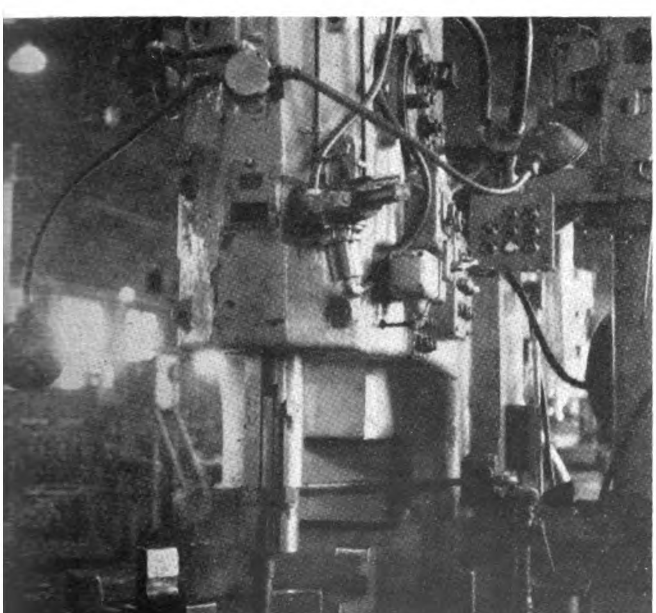


hop is arranged for orderly flow of materials. Mounted wheels ire handled on journal and tread lathes at upper right.

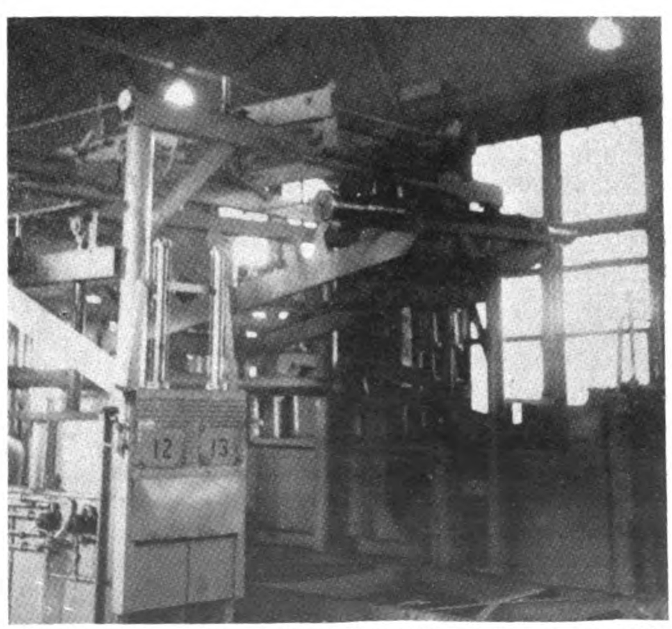
ɪperated to turn out standard freight-ar axles. The Niles lathe, operated ıanually at present, is designed for utomatic operation. It has only re-ently been installed. While journal izes are restored to AAR specifica-ions on all these lathes, wheel seats re only cleaned, not sized.

All finished axles are automatically nloaded onto the bottom transfer rack at the Magnaglo. The operator semi-automatically feeds these axles through the process and out on the top transfer rack for movement back to the top deck of the conveyor. A complete inspection of each axle is made at this station for finish, out-of-round and journal length. The axles are "miked" for wheel fit sizes. Each axle is given a serial number and the size is recorded opposite this number. The size is also marked on the axle. An engine lathe next to the Magnaglo is used for polishing diesel locomotive axles.

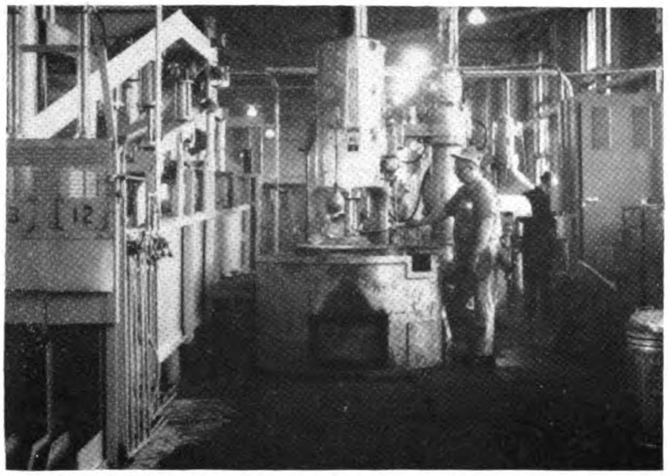
Before the axles are processed through the production line, the sizes are segregated. Normally, most of the axles run are 5½ x 10 in. The 5 x 9 and 6 x 11 axles are grouped in lots of 100 and processed consecutively. Un-



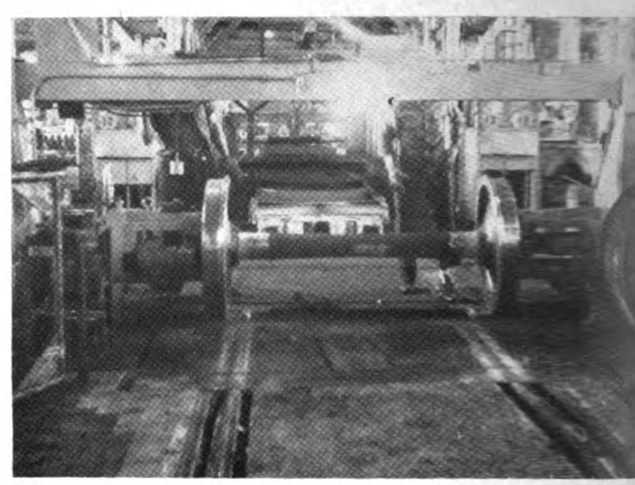
ill 13 has the automatic sizing bar for boring wheels to diameters ıich have been transmitted from the sizing station.



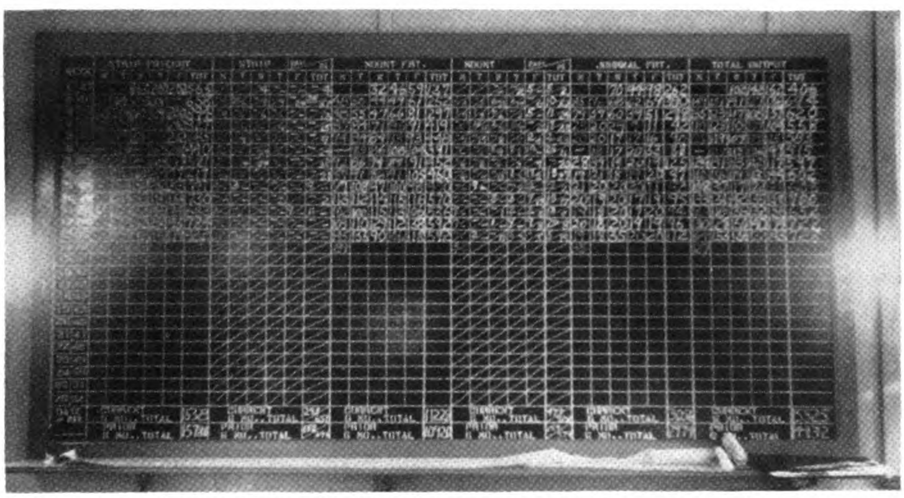
Axle released from sizing station is lowered to platform for assembly with wheels before entering wheel press.



Mill 12 bores freight-car wheels which move into chutes for assembly with axles. Machine is now manually controlled.



Wheel and axle set in position at east mounting press. Wheels from either Chute 12 or 13 on each side are assembled with finished axle.



Each day's complete output is maintained on production board. Recent six-month production was 1,100 wheel sets higher than preceding six-month period.

der present operations, the output of 6 x 11 axles averages 100 per month and 5 x 9 size averages 100 per week.

Axles returned to the top deck of the conveyor from the Magnaglo travel about 18 ft to a transfer rack equipped with an elevator. Each axle is lifted to a transfer rack across the aisle and rolls by gravity to a second elevator. This elevator picks up the axle, swings it 90 deg, and places it on the rack leading to the sizing station. To eliminate rough handling, stops at intervals on the transfer rack automatically release the axle to roll a series of fixed distances. Elevators, stops and sizing station position are controlled from a pushbutton panel.

Of the three Niles boring mills adjacent to the sizing station, two are manually operated and the third is fitted for automatic machining. Mill 14 is equipped with an adjustable side head for turning and facing hubs on diesel locomotive wheels. Mill 12 is used for freight-car wheels only. Mill 13, equipped with an automatic sizing bar, produces freight-car wheels. The same equipment will soon be applied to Mill 12.

At the sizing station, each axle, released from stops by pushbutton control, rolls into position and is centered. The two probes transmit wheel seat sizes electronically to Mill 13. The operator can bore either the right or left wheel by pressing the proper button on the mill control panel. The electronic equipment automatically adjusts the roughing, finishing, and hub chamfer tools on the boring bar to the proper dimensions. Axles to be fitted with wheels manually bored on Mill 12 are moved through the sizing station by pressing a by-pass button. The operator of this boring mill has previously been provided with the axle serial number and wheel-seat sizes.

Bored wheels from Mills 12 and 13 move on a roller conveyor to a tip-up machine which places them in a vertical position. They then move on gravity rollers in two-channel chutes along the sides of the framework supporting the sizing station. Wheels from Mill 13 are in the inner channels; those from Mill 12, in the outer channels. The wheels roll to the exit end of the chutes leading to the east mounting press. Pushbutton controls release each right and left wheel. An overhead cantilever arm carries the axle released from the sizing station down to a platform. After white lead coating is applied to wheel seats, the wheels are manually moved on the axle and the assembly is rolled into the press where wheels are mounted. Tapes which record all wheel mounting pressures are checked daily. If found below AAR specifications, the wheels are removed and remounted on other axles. The wheel set is placed on rails and rolls by gravity to the east end of the shop for loading on a wheel car.

Under the sizing station is an axle storage rack from which axles by-passing the sizing station can be taken for use with wheels manually bored on Mill 14. These assemblies are mounted on the west stand-by press.

New loose wheels, loaded in gondolas, are unloaded directly from the cars to gravity supply racks along the shop's north wall adjacent to Mills 12 and 13. Diesel-locomotive and passenger-car roller-bearing wheels are mounted on the east press and roll by gravity to the east end of the shop. Small presses are used for mounting the roller-bearing boxes on the passenger-car-wheel assemblies. Induction heaters are used for applying sleeves and water guards to diesel-locomotive wheel assemblies.

Rebuilt IC Coaches Have Semiconductor Devices

Semiconductors, including silicon iodes and transistors, have been used ı generating and temperature-control quipment on coaches rebuilt by the linois Central. Such equipment in- ovations are an example of the IC iechanical department's constant ef- orts to apply new technologies to olling-stock problems. R. I. Fort, lectrical engineer-equipment, recently old a meeting of electrical super- isors in St. Louis that it is important o look into new technologies to see hat can be used for giving better esults, increasing efficiency, making n operation easier, or reducing main- nance requirements.

The seven lightweight cars on which ie new electrical devices have been sed were acquired from the Chicago : Eastern Illinois in 1961 when that oad found them unneeded for its pas- enger operations. After delivery to ie Illinois Central, they were com- letely overhauled and re-equipped by ie IC's Burnside shops in Chicago. hese Pullman-Standard cars, built in 946, have been made fully equivalent o the other 60-seat coaches which ave previously been used on IC name" trains. "These coaches are in eeping with our railroad's aim to pro- ide the best for its passengers," E. L. Iolmes, IC passenger traffic manager, ommented when the first car went ito service last year. "We are proud f the job done on them, and we feel iey are equal to the best coaches in ie country."

Because the cars were similar to iose already in service on the IC, ie job of refitting was somewhat mplified. Interiors were completely ripped and all exterior equipment, cluding trucks, was removed for re- uilding or replacement. The car- odies were repaired and vestibules ceived extensive remodeling, with ainless-steel being used in place of ie original LAHT steel to combat orrosion in these high-maintenance eas. The original folding steps, trap oors and platforms were replaced ith stainless-steel stationary-type eps, traps, platforms, and flashing. arbody exteriors were refinished in standard IC passenger-car colors of brown, orange, and yellow.

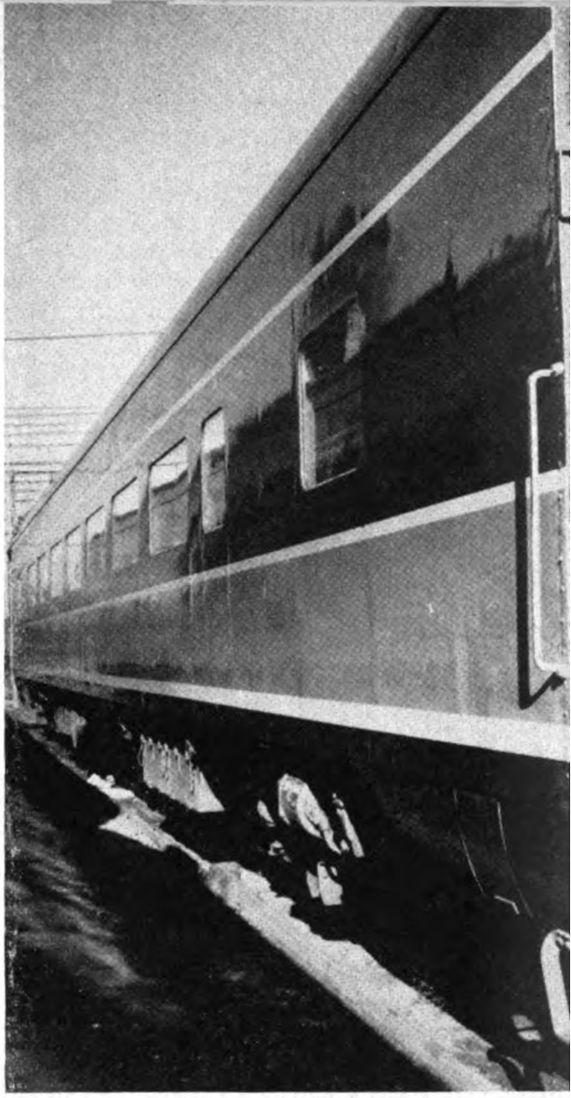
Trucks were completely disassembled, thoroughly cleaned and inspected, and were rebuilt with higher capacity equalizer and bolster springs required because of the increased car weight resulting from the application of some heavier components. First of the rebuilt cars weighed 121,241 lb.

Higher Voltage

Car electrical systems are changed from 32 to 64 volts to conform to IC standards. Spicer axle-gear-drive units replace the original Pullman mechanical-belt-driven installations. The cars were equipped with brushless generators having static generator regulators, marking the first application ever made of this large capacity brushless generating equipment developed by Safety Electrical Equipment Corp. Having no commutator or brush gear and eliminating the necessity of a polarity reversing switch, these machines were designed to offer the optimum in reduced maintenance for car-lighting applications. A completely static control package gives voltage regulation and current limit. Static blocking diodes are used between the generator and battery.

Each machine embodies an exciter with the alternating current carried to rotating silicon diodes for rectification. The output of the diodes is then fed directly to the rotating field of the generator, eliminating brushes, slip rings, and commutators. Regulation is accomplished by sensing the output from the generator stator and controlling the excitation of the exciter field to produce constant voltage output regardless of the speed and load. Silicon diodes for the rectification of the main power output are placed within the generator housing.

All rotating elements are mounted on a sleeve for ease of replacement. One feature of the design is that rotors for a given kilowatt rating are interchangeable regardless of the rated output voltage of the machine, which could mean a reduced inventory of



Exteriors have been made completely compatible with standard IC passenger cars.

Interiors of cars have been completely refinished in a variety of color arrangements.

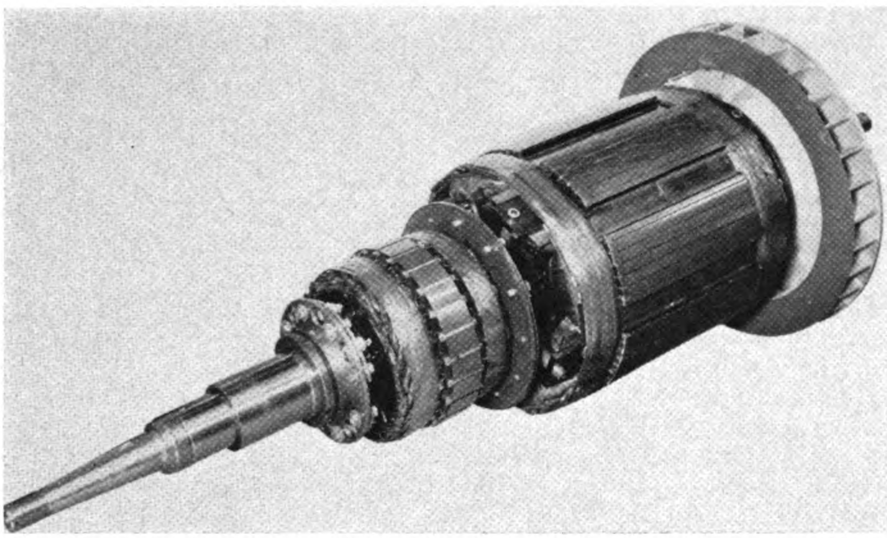
replacement parts on those railroads that utilize more than one of the common voltages.

The generator and genemotor dimensions, both diameters and lengths, are within those of previous Safety d-c generators, minimizing the problems involved in changing from the older type of equipment to this new type.

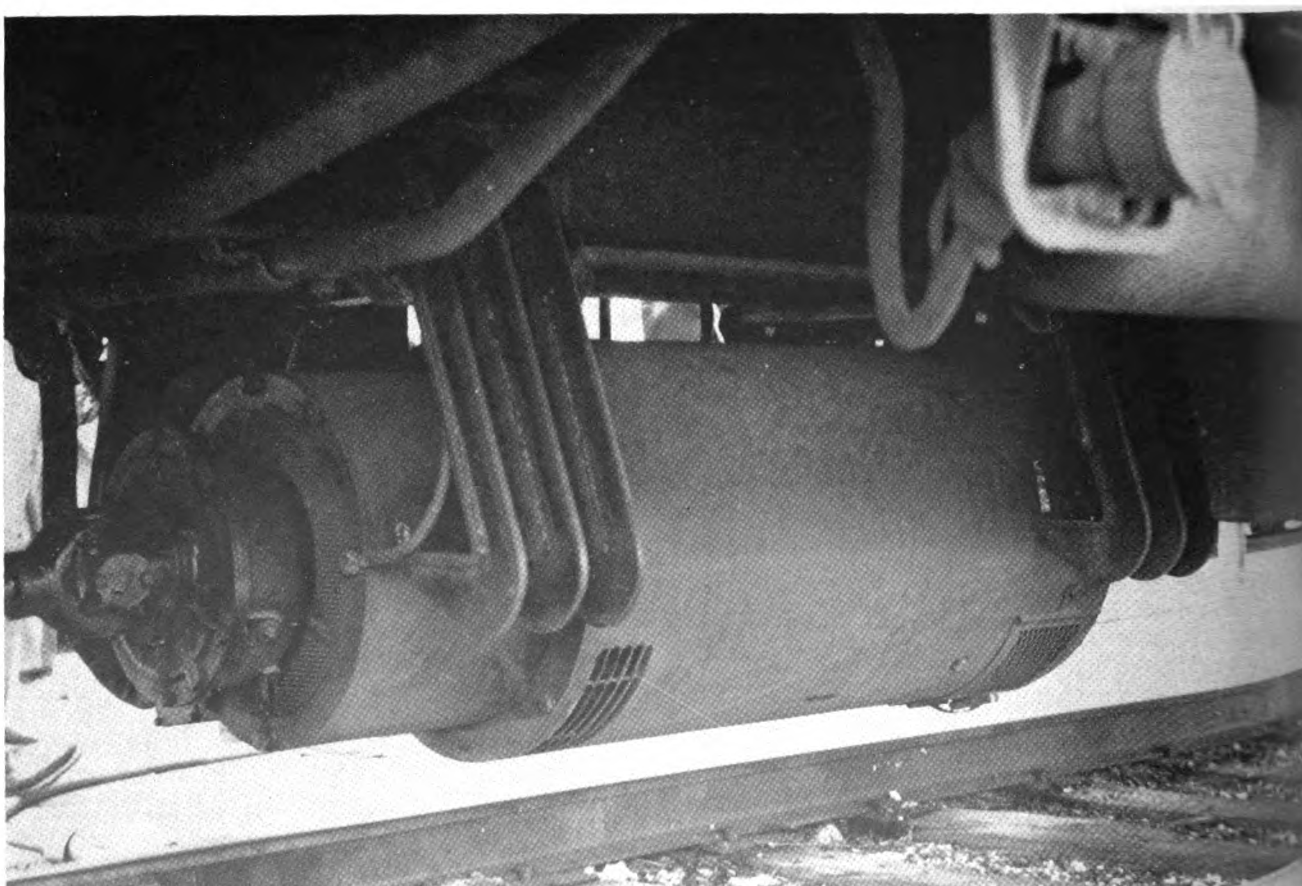
Three cars have been fitted with Frigidaire electro-mechanical air conditioning and 25-kw genemotors. Four cars have Waukesha engine-driven air-conditioning equipment and 10-kw generators for car lighting and battery charging.

Commenting on this equipment, Mr. Fort recently reported that "the brushless generator, in service since March 1962, cost about $1,000 more per car than conventional equipment. We figured we would get that back in somewhere between five and ten years, well below the car's expected life. After eight months, we had done absolutely nothing to that generating equipment, not even blowing the generators. The cars are running 600 to 1,000 miles a day. We find the batteries are arriving in better shape than those on the conventional equipment in the same train and flushing intervals are 50% longer. The reduced maintenance for flushing and expected increased battery life may make our investment pay out in two or three years."

The original zone-type steam heating installation on the cars was replaced with a Vapor Unizone system. A Rador wall-type temperature sensing device operates the new Vapor transistorized air-conditioning and heating panel which replaces the Vapor pilot relay panel. This unit has transistorized switches instead of relays, eliminating all moving parts, reducing maintenance, and increasing operating life. Heat is controlled by



Rotating element of the 10-kw generator clearly shows the exciter, field rectifier diode ring, balancing ring, and rotatiing field structure and fan. All 10-kw machines can use this rotor.



Genemotor of 25-kw rating is mounted under one of the rebuilt cars. It illustrates the high capacities in which the new generating equipment using semiconductors can be built. This machine supplies power for air conditioning as well as lighting.

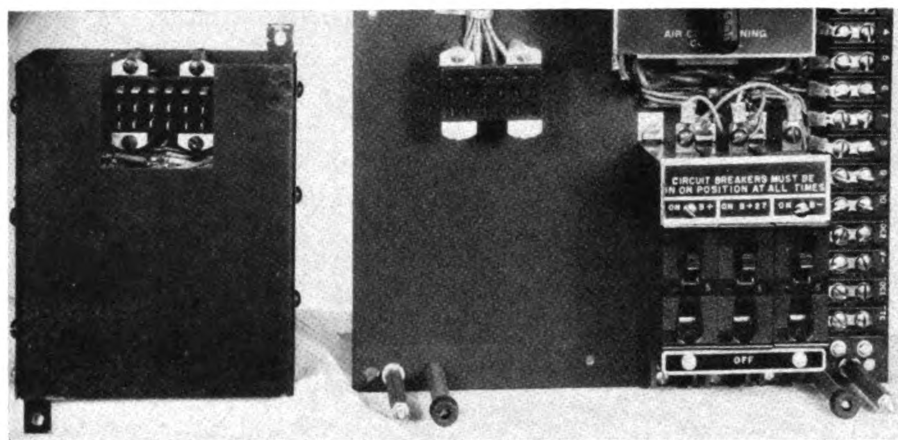
one thermostat in the body of the car, cycling two Vapor 968 regulators through one of the transistorized circuits. These regulators supply steam to floor radiation and to the overhead heater.

Cooling is controlled by two thermostats placed under the heating thermostat. The first thermostat is set slightly lower than the temperature of the heating thermostat. This thermostat energizes the compressor and operates cooling at low speed with the compressor partially unloaded to give approximately 25% of the cooling capacity. If the car temperature continues to rise, the second cooling thermostat operates the compressor at high speed and capacity. Two-stage cooling, which eliminates frequent on-off cycling, is used because it provides smoother control of temperature and humidity, particularly during moderate humid weather.

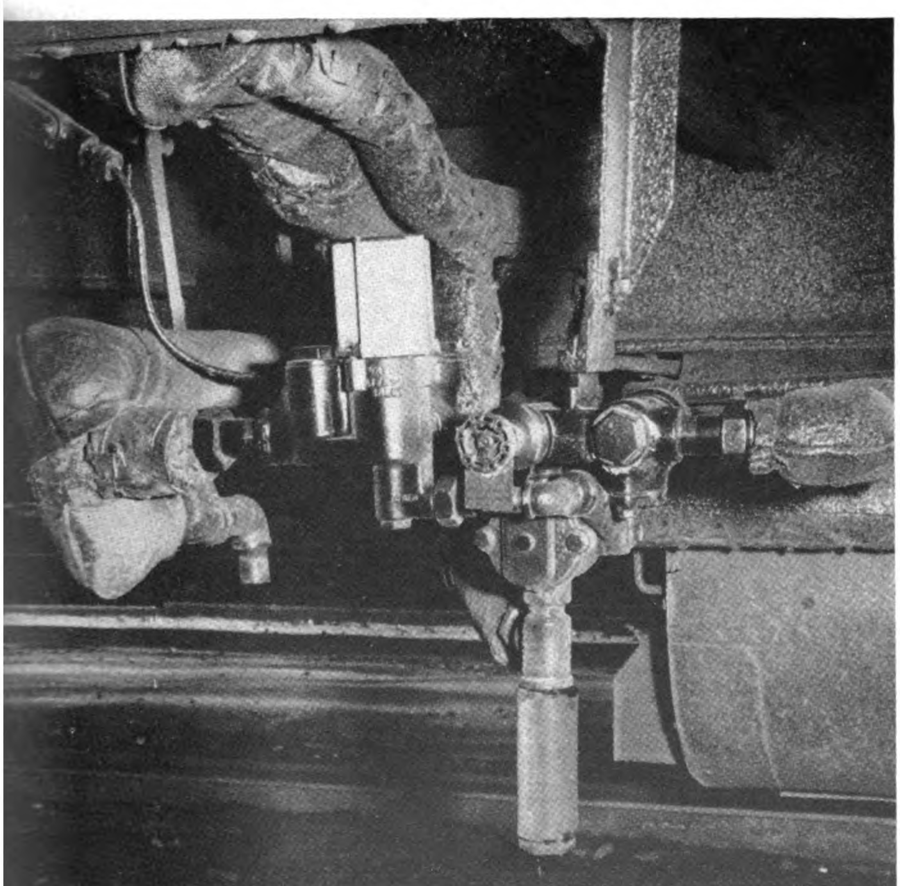
The regulators of the original Vapor Zone system supplied steam at constant pressure to five admission valves, each controlled by a thermostat, for heating different areas of the car. Conversion to Vapor Unizone and the application of the 968 regulators beneath the car eliminated the steam admission valves and switched the thermostatic control to the regulators. With this simplified control system, steam is supplied to the car radiation at varying pressures and volumes as required.

Colors for interiors of the refurbished cars were developed by an outside designer. Seat upholstery colors are varied in successive cars. Dominant seat colors in individual cars are rust, Sherwood tan, Kalura tan, and turquoise. Ceilings are ivory, while side walls and bulkheads are finished in plaza green or gray. Floor covering consists of red rubber tile for areas under seats, with aisle strips of rubber in mahogany and Brazil brown.

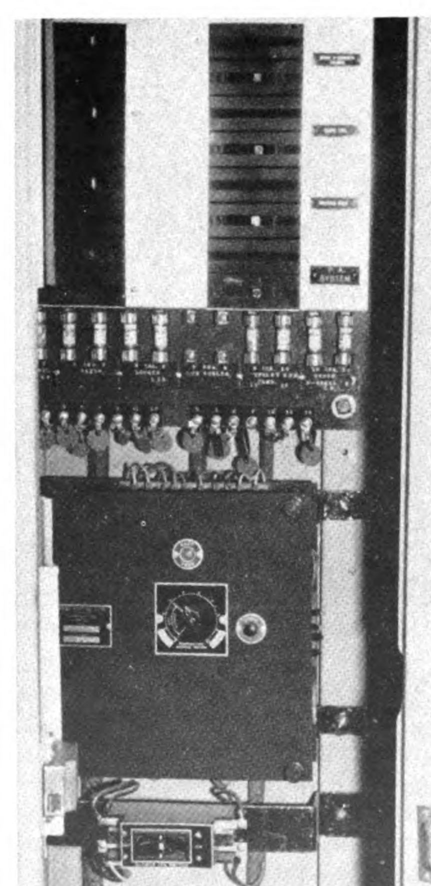
Four of the cars operate in the Chicago-Florida "City of Miami," two in the Chicago-New Orleans "City of New Orleans," and one in the Chicago-St. Louis "Green Diamond." Acquisition and rebuilding cost the IC about $400,000.



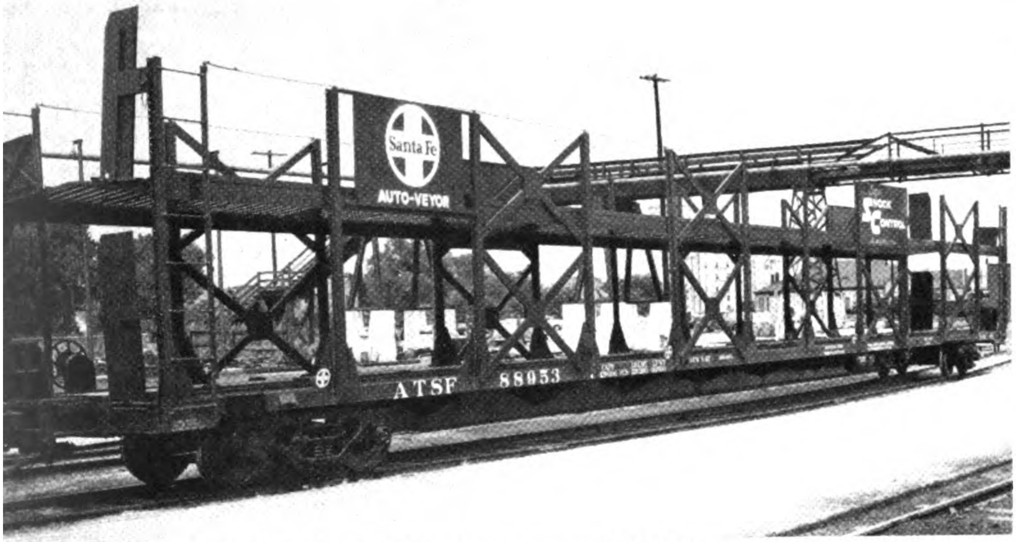
Transistorized "black box" (left) for temperature control eliminates relays and other moving parts. Plug-in feature simplifies removal, making maintenance easier.



Unizone regulator, mounted under car, supplies steam for simplified heating system. It is controlled by single thermostat. Cooling control involves two thermostats.

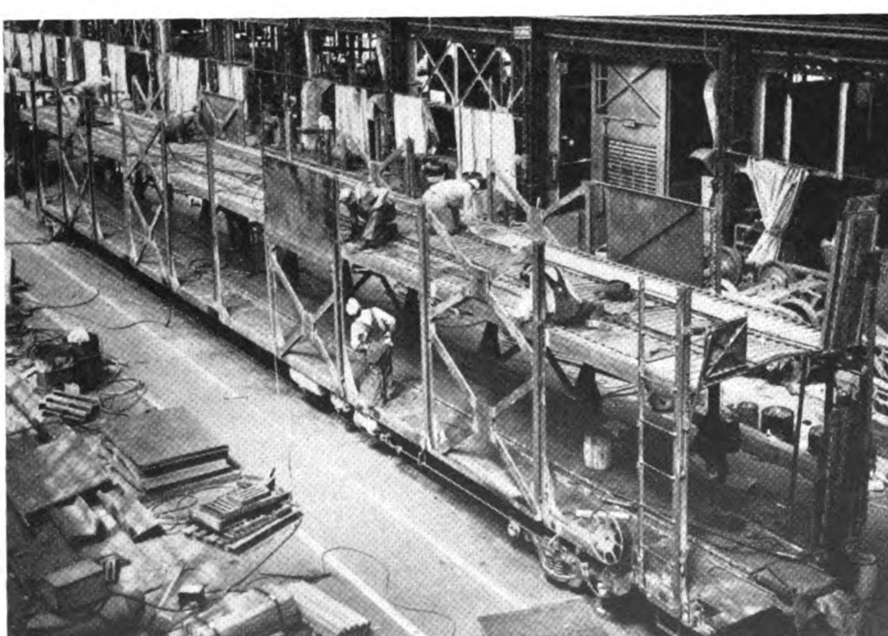


Transistorized temperature control panel occupies small space in electrical locker.



Upper decks could be riveted in place because cars are individually assigned.

Automobile Cars Have Hydraulic Cushioning



Topeka shop is building these hydraulically cushioned cars for automobile transportation.

Flat cars with Super Shock Control hydraulic cushioning are being built by the Santa Fe for automobile-hauling service. Most of the 87-ft cars are being equipped with bi-level and tri-level racks which, because of the 18-in. sliding-sill arrangement, can be installed with no above-the-deck cushioning. This fixed rack and hydraulic cushioning arrangement was utilized in the road's first tri-level car which went into service in January 1960. The 100 flat cars now under construction include 65 bi-level cars, 31 tri-levels, and four which are used for saddle-back loading of highway motor trucks.

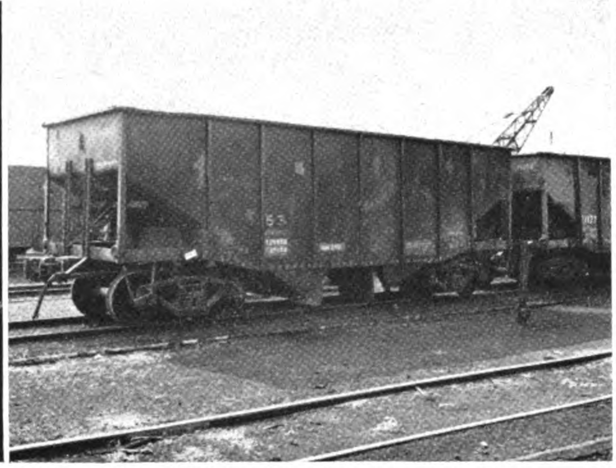
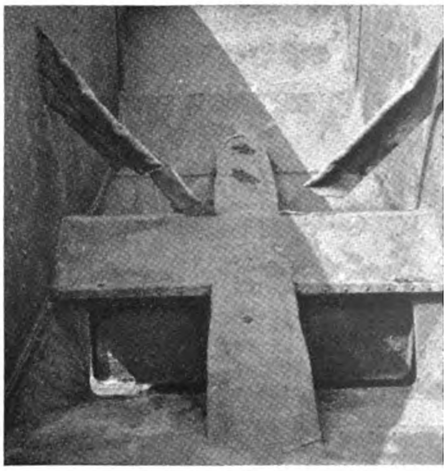
Shipper demands for more effective cushioning led to the use of the Super Shock Control underframes in these cars. This cushioning system, developed by the Santa Fe in 1958 (RL&C, Oct. 1958, p 21), is now manufactured by the Keystone Railway Equipment Co. About 3,500 cars, primarily box cars, are now in service with this system on various railroads, with the Santa Fe continuing to be the major user.

The 10-in. travel of the early Shock Control units has been extended to 18 in. in the later Super Shock Control devices. In both, the sliding sill is cushioned by a double-acting piston in a cylinder and housing.

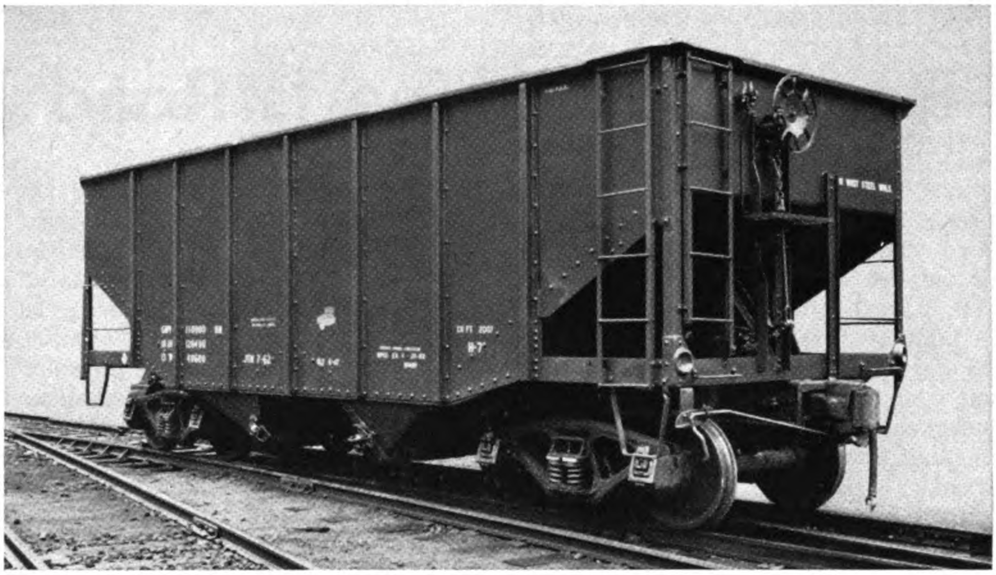
The space between the outer cylinder wall and housing is filled with hydraulic fluid to within 2 or 3 % of capacity. Orifices of predetermined diameter and location are spaced at the bottom of the cylinder to permit oil to flow out of the cylinder. When the double-acting piston is displaced from its center position to the right, the oil on that side of piston is compressed and is forced out through the orifices. This movement of oil opens the check valve in the left cylinder head wall and allows oil to enter on that side of piston. Some oil also enters through orifices on that side. As the orifices are closed by the piston movement, the pressure rises but does not go up very fast because of the oil being forced out through the remaining orifices. The pressure curve builds up in a fraction of a second at the beginning of the stroke, then levels off. The shock of impact is eased in this manner.

Instead of using bolts, the Santa Fe has riveted the second and third decks in place on its new cars, giving a more unified and rigid structure. Because the auto-rack cars are assigned to specific automobile manufacturers, each prescribing limits for deck height, Santa Fe officers say that relatively few changes have had to be made because of 1963 automobile and truck designs. Length over superstructure and end sills is 87 ft 4 in., and length over strikers, 91 ft 5½ in. Height from rail to first deck is 3 ft 3$^{3}/_{16}$ in.; extreme height, 13 ft 10½ in. Truck center distance is 72 ft and car-wheelbase, 77 ft 8 in.

The cars are equipped with cast-steel trucks having 3$^{11}/_{16}$-in. travel springs and roller bearings, automatic slack adjusters, and two complete sets of air-brake equipment, including two AB valves.

100 "tired" 50-ton hopper cars



re-bodied by Bethlehem

Skillful engineering gives cars many more years of service with low maintenance expense

Quite a difference in these cars, before and after the face-lifting they received at Bethlehem's car shops! And the re-bodying job cost less than you might think.

The ingenuity of Bethlehem's engineering group made possible the salvaging of many of the original components. In addition, the obsolete impact cushioning was replaced by a fixed standard AAR center sill, thus making the rejuvenated cars less costly to maintain. The cars should provide many more years of service.

The customer complimented Bethlehem's engineering and showed confidence in our workmanship by accepting Bethlehem standard inspection exclusively. We can do an equally satisfactory job on your "tired" freight cars, and will welcome the chance to prove it.

If you would like to take advantage of the new AAR ruling which permits a 5-pct rail-load increase, you can do this by having Bethlehem replace your worn-out 50-ton hopper-car bodies with new, enlarged bodies, suitable for carrying more than 7 tons of additional payload on your existing 50-ton trucks. Our engineers will be glad to explain our proposal for such an increased-cube car.

Steel

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BETHLEHEM STEEL

Three-unit locomotive is being used to evaluate possible use of coal as locomotive fuel on Union Pacific which has large reserves of coal in W

Coal-Fired Gas Turbine Is Road Tested

The first direct-fired coal-burning gas turbine-electric locomotive is now undergoing road tests on the Union Pacific. The locomotive, designed and built by the UP, is rated at 7,000 hp. It consists of a 2,000-hp diesel-electric A unit, the 5,000-hp coal-fired gas turbine B unit, and a tender which carries coal-pulverizing equipment and coal. Total length of the two locomotive units and tender is about 215 ft.

Arthur E. Stoddard, UP president, said development of the locomotive was "strictly an experiment to evaluate the feasibility of using coal to power a gas turbine in locomotive service. Mr. Stoddard explained that the decision to develop the locomotive was made with the view of enabling the railroad to resume the use of its abundant coal supplies which have been little used in recent years because of the extensive use of locomotives which burn only petroleum fuels.

The UP, long a leader in the development of high-horsepower motive power, now has in regular freight service 19 oil-fired gas turbine-electric locomotives of 4,500 hp each (RL&C, July 1949, p 363), and 30 units of 8,500 hp each (RL&C, March 1959, p 44). It is the only railroad using gas-turbine motive power. All of the turbines are simple open-cycle prime movers built by General Electric.

Only one direct-fired coal-burning gas turbine has been tested previously and that was an experimental stationary installation. None has ever before been applied to railroad motive power. Combustion and ash separation problems, not encountered when oil is used for fuel, have been the major obstacles to the use of coal for fuel in gas turbines.

Research Program

In 1944, leading coal producers and coal-carrying railroads undertook to produce a coal-fired locomotive which would surpass any existing locomotive in economy and operating characteristics. This group formed the Locomotive Development Committee which was affiliated with Bituminous Coal Research, the nation-wide research agency of the bituminous coal industry. Roy B. White, then president of the Baltimore & Ohio, was chairman of the committee. John I. Yellott became director of research and, later, P. R. Broadley, now mechanical-electrical engineer of the Jersey Central, was in charge of research at the Dunkirk, N.Y., laboratory.

Early in the research program the decision was made to develop a coal-fired gas-turbine unit, that prime mover having been rated as having the greatest potential for achieving the group's original objective. By 1957, after a dozen years of laboratory and design work, the program had progressed to a state when LDC actually prepared designs of road and road-switcher type turbine locomotives which could be coal-fired. While the UP had not been one of the original LDC participants, it signed an agreement with Alco in 1957 leading to the design of components for a coal-fired turbine locomotive. (RL&C, Sept. 1957, p 37). With the dissolution of LDC shortly thereafter, the Bureau of Mines took over the Dunkirk laboratory equipment and transferred it to Morgantown, W.Va., where work has continued on the use of a coal-fired gas turbine for stationary power generation.

In the late stages of testing at Dunkirk, the coal-fired turbine operated for extended periods without interruption. Many runs were made with cycles simulating actual road service. On simulated runs representing Union Pacific freight operation between Cheyenne, Wyo., and Ogden, Utah, the LDC 3,540-hp turbine operated an equivalent of 8,290 miles, producing the equivalent of 1,722,000 ton-miles while burning Wyoming coal at the rate of 42.8 lb per 1,000 gross ton-miles. A total of 370 tons of UP coal were burned at Dunkirk with a thermal efficiency of 16.1%.

The first, or lead, unit of the experimental locomotive is a modified 2,000-hp Alco diesel-electric locomotive unit which supplies power to crank the gas turbine in starting and then provides 2,000 hp for pulling a train. The gas-turbine unit and diesel-electric unit add up to a 7,000-hp locomotive. A turbine fuel oil storage tank has been installed in the rear of the A unit.

re has been tested on Omaha-Cheyenne runs.

eight Service

The second unit, 101 ft long, contains the gas turbine power plant, coal combustion and ash separation equipment, main generators, and an auxiliary diesel engine coupled to a 500-kw alternator to provide electric power for coal processing equipment. Eight of the twelve axles on this unit have traction motors, drawing their power from the main generators driven by the turbine. This running gear came from a retired Great Northern electric which the UP purchased in 1959. All rebuilding of the unit was done in the shops of the UP at Omaha, Neb.

The third unit, a tender, carries 61 tons of coal, which is sufficient for a tonnage run of about 500 miles. The equipment to process the coal required by the gas turbine unit is also installed on this tender.

Turbine Components

Major components of the turbine power plant are a compressor section, combustors, fly ash separator, and the turbine assembly itself. Air, compressed to about six times normal atmospheric pressure in the 15-stage axial-flow compressor, goes into the combustors where fuel is mixed with it and ignited. Reaching a maximum temperature of 1,450 deg, the resulting gases expand through the two-stage turbine and discharge through an exhaust hood. The turbine shaft delivers 5,000 hp through reduction gears to the generators and also drives the turbine compressor. Diesel fuel is used in starting the turbine and the switch to coal is made automatically after it is running.

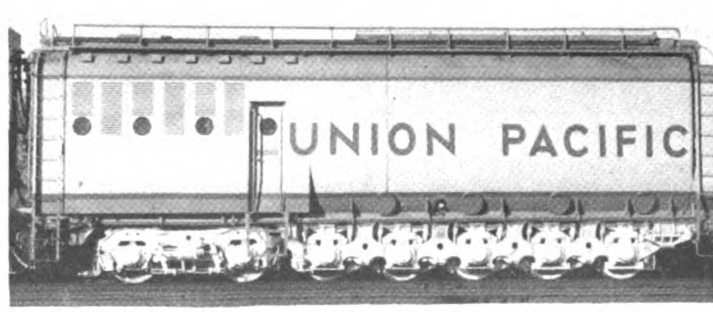
When the turbine is operating on coal, nugget-size pieces (about 1 by 2 in.) move through crushers and a pulverizer where they are reduced to particles small enough to move in a fluidized state when introduced into the combustion air stream. This "fluidized" coal has much the same handling characteristics as a liquid. The crushed coal is stored in a 2½-ton bin in the processing compartment of the tender. Two coal pumps meter crushed coal to the two pulverizers in accordance with turbine fuel requirements. With this system, the amount of pulverized fuel is kept to a minimum being processed only as required. After the coal is ignited in the combustors, the gases pass through ash separation equipment where the non-combustible abrasive ash is drawn off to reduce wear on turbine buckets.

The turbine power plant was converted from one of those used in the 4,500-hp locomotives, with considerable redesigning, including an increase in horsepower to 5,000.

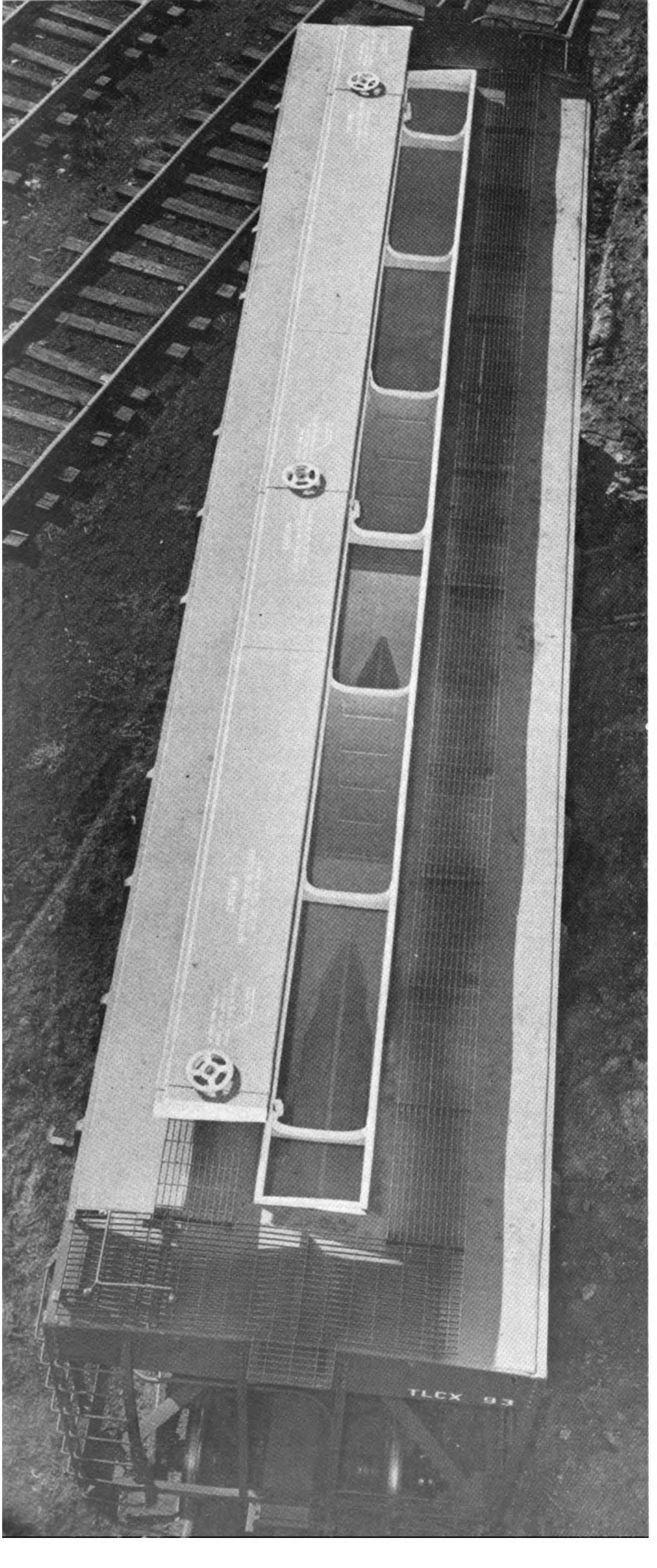
The designs of coal combustors, fly-ash separators and coal-handling equipment for the UP locomotive are all based on work done by the Locomotive Development Committee. Adaptation of the equipment for road-locomotive use has necessitated extensive redesigning. Alco Products, Inc., and General Electric Co., collaborated with the UP in this work.

The gas-turbine locomotive unit, completed over a year ago, underwent an extensive stationary test program at Omaha prior to its road testing. Initially, it was fired with fuel oil; later, with coal. Road tests have been conducted on the UP main line between Council Bluffs, Iowa, and Cheyenne, Wyo., over 500 miles. The locomotive has handled UP freight trains over various parts of this line, as well as making through runs.

Coal-fired turbine unit is 101 ft long and 17 ft over the turbine exhaust. All axles were powered when running gear was under GN electric; now only the center eight axles have traction motors. Electrical equipment, as well as turbine, was supplied by General Electric.



Tender from scrapped steam locomotive has been rebuilt to carry coal for turbine. Its overall length is 48 ft 1 3/8 in. Coal-handling and processing equipment are based on designs originated with Locomotive Development Committee. Fuel capacity of tender is 61 tons.



Trough-Ro

A covered hopper car which promises to offer a solution for the shortages of Class A box cars used for bulk movement of grains and other granular materials was loaded and unloaded in its first demonstration at Port Cargill, Savage, Minn., in mid-December. Industrial, milling and grain executives in the Twin Cities area were shown the Pullman -Standard PS-2CD, a 4,000-cu-ft car equipped with a single 40- x 2-ft trough hatch in place of the conventional individual hatches used on standard covered hoppers. Along with this uninterrupted loading feature, the car also has center-discharge outlets with quick-acting gates for fast unloading of the car's three interior compartments.

In the demonstration, the car was loaded with 168,000 lb of corn in 12 min. Unloading at a Cargill elevator required only 2 min 40 sec from start to finish because the car, with its three gates fully open, was spotted over a 25-ft discharge pit equipped with a 42-in. belt conveyor having a capacity of 25,000 bu per hr.

In comparison, plant officers said it takes about 35 min to unload box cars presently used in grain service. The PS-2CD unloading time is expected to be four times better and also to eliminate contamination and spillage.

"Building a covered hopper for the grain trade presents a whole new set of problems in car design," says George L. Green, vice president of marketing for Pullman-Standard. "Standard car length must be maintained to meet

Partial List of Suppliers

Truck bolsters, side frames, ride control parts, roller-bearing adapters	National Castings
Truck springs	Crucible Steel
Roller bearings	Timken Roller Bearing
Wheels and axles	United States Steel
Side bearings	A. Stucki
Couplers and yokes	Buckeye Steel Castings
Air brake equipment	Westinghouse Air Brake
Brake shoes and keys	American Brake Shoe
Brake beams	Chicago Railway Equipment
Brake rod jaws, bottom connections, brake levers	Schaefer Equipment
Brake steps, running boards	Apex Railway Products
Draft gear	Cardwell-Westinghouse
Wear plates for unit beams	Unit Truck
Slack adjusters	American SAB
Discharge gates	Enterprise Railway Equipment
Paint	Pittsburgh Plate Glass

vered Hopper Speeds Bulk Loading

isting terminal and elevator loading-
ıloading facilities."

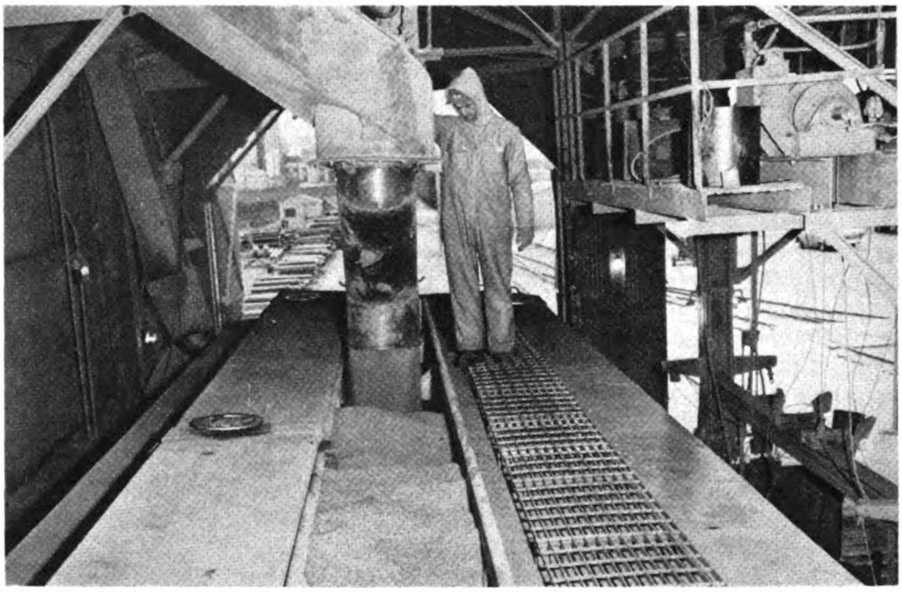
The 100-ton PS-2CD car with the ɔugh hatch is one of two built at ıllman-Standard's Butler, Pa., plant, r Transport Leasing Co. The car monstrated at Cargill and leased rough Transport Leasing is current- in service on the Burlington, being ed in experimental services for dem- ıstration to grain and milling com- ınies. On the day after the Cargill st, the second PS-2CD was demon- ated at Continental Grain Co. in ıffalo, N.Y., for Continental and ew York Central personnel. Wheat, rn, and oats were loaded and un- aded. Unloading time averaged 16 in for 175,800 lb of wheat, for 170,- !8 lb of corn, and for 143,296 lb of ıts. To meet the capacity of the han- ing equipment in the discharge pit, ıly one gate was one-third open.

The two experimental cars are of e same basic design of all PS-2CD vered-hopper cars built by Pullman- andard. The same welded construc- ›n has been utilized. Length of the r between strikers—47 ft ¾ in.— mains the same. The increased ca- city was obtained by decreasing the ›pe-sheet angle from 50 to 45 deg ıd increasing the car's height and dth. Length inside the body is 46 ft in.; inside width, 9 ft 11⅛ in. eight from top of rail to top of run- ng boards is 14 ft 7 13/16 in., and to p of trough hatch, 14 ft 11 5/16 in.

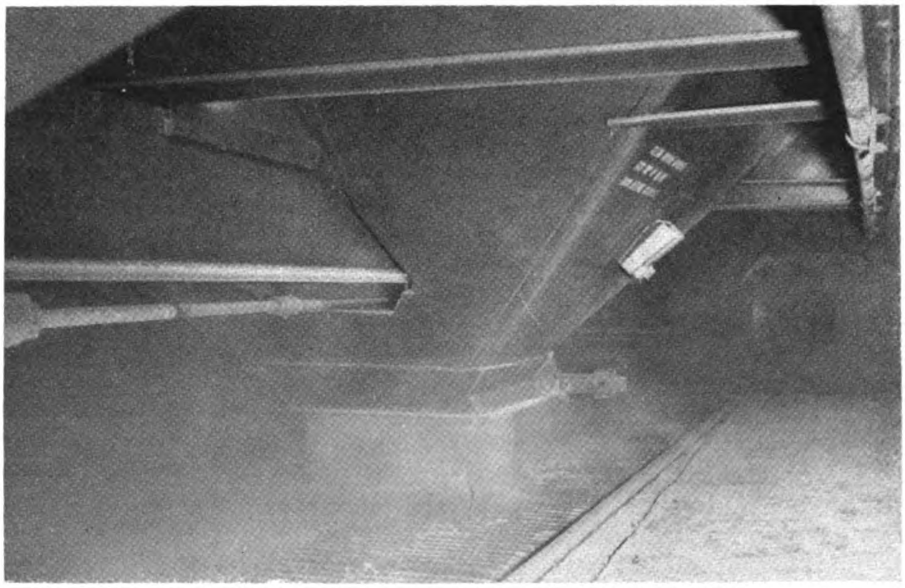
This high-cube design permits the tal length over the three 13- x 24-in. scharge gates for between-the-rail ıloading to be kept under 25 ft, ıich is generally the length of receiv- g facility discharge pits. Discharge ıtlets are spaced on 11 ft 3⅝-in. nters. The sliding discharge gates, ıich are manually opened from ther side of the car with a single 180- g turn of the operating ratchet, are ›ened in succession to dump the con- nts. Unlike the conventional design six unloading gates with three on ch side of the car's center line which quired a man to walk around both des to open, there is no tendency to ıload on the rails or outside them.

On cars equipped with individual ading hatches, it was necessary to ot the car several times, depending ı its length, and to relocate the load- ing spout. This also meant intermit- tent shutting off the grain flow from the elevator in loading through a series of individual hatches, and peaks de- veloped in the lading required a man to shove the grain to one side to pre- vent clogging and spillage. With the trough-hatch car, the discharge spout is entered at one end of the trough and the car is moved slowly by a car puller or locomotive to permit a constant flow from the elevator. Patents on the trough hatch design are pending.

Pullman-Standard has, in the new PS-2CD, a high-capacity covered- hopper car to meet the requirements of grain shippers and a multi-purpose car available to railroads for many types of bulk commodity products. The car with center unloading gates can be equipped both with manual and/or pneumatic discharge outlets and either with trough hatch or indi- vidual hatches. Sanitary linings are available for all commodities to pre- vent lading contamination. There are over 1,700 PS-2CD center discharge cars currently in service or on order for 15 carriers handling such bulk lad- ing as malt, all types of grain, sugar, polyethylene, and other agricultural and mineral commodities.



Uninterrupted end-to-end loading of bulk materials is possible with the trough-roof car.



Rapid emptying is assured with hopper arrangement used on all P-S center-discharge cars.

Requirements of Future Truck Desig

Requirements of the trucks for future freight cars were discussed at the Winter Annual Meeting of the American Society of Mechanical Engineers in New York. While today's conventional two-axle freight-car truck has coped quite well with higher sustained train speeds and heavier car loading, it was shown that this design does have limitations which could present problems in the years ahead. Truck design and appraisal of the forces to which cars and ladings are subjected were called "problems fundamental in improving the railroads' transportation capabilities in the next few years" by C. D. Buford, AAR vice president. The discussion indicated that probably the eventual answer to the truck problem will be the use of two basic designs—one for bulk-commodity cars which would be much like today's standard truck and another, a more sophisticated arrangement, for cars carrying fragile ladings. Viewpoints of railroads, carbuilders, truck manufacturers and shippers were given. Panel speakers were: for railro —L. S. McGregor, chief of moti power and car equipment, Ca dian National; shippers—C. Naffziger, director, freight loss damage prevention section, AA carbuilders—W. Van Der Slu associate director of research a development, Pullman-Standar and truck manufactures—C. Tack, vice president, engineeri American Steel Foundries. T moderator of this freight car tru design panel was W. M. Kell vice president—research, AAR.

Railroad Requirements

L. S. McGregor,

To define the characteristics of railroad operations is a most complex problem. Aside from the difficulty of forecasting future transportation service demands, effects of a number of freight-car-truck operating elements are unknown or unevaluated. Needed are the limiting accelerations, frequencies and amplitudes for avoiding damage to different lading categories. Forces transmitted from the trucks to the carbody and lading must be related to the longitudinal forces originating through the coupler before an optimum ride quality objective can be specified. Gathering of this basic data, essential to optimum truck design, is primarily the responsibility of the railroads because it can only be obtained from instrumented road tests.

Variables inherent in the truck and the medium within which it must function limit the practicability of a wholly theoretical approach to truck design. Although track gauge, alignment, and joints can be measured in a static condition, appraisal of these factors when trucks are running over the track at speed is little known. Another obscure area is the relation between the natural frequencies of track and roadbed with those of trucks and carbodies. Despite the incomplete data related to dynamic truck environment, it is generally recognized that the present standard integral-side-frame trucks provide acceptable riding qualities for most categories of goods and have proved to be operationally reliable up to speeds of 70 mph. The railroads, now faced with requirements for faster service, larger and heavier cars, and lading protection, must develop not only higher capacity trucks, but also improvements in the present standard designs.

In developing a freight-car-truck design with improved ride quality, a designer must conform to a number of restrictive conditions if that truck is to be practical and acceptable to railroads:

- Vertical movement of the suspension elements must be restricted to coupler height limits;
- Low manufacturing costs must be maintained due to the large number of vehicles involved and the relatively low return on capital investment;
- Little increase in weight can be tolerated because the increase in truck weight reduces the pay load;
- Low maintenance and good reliability are necessa

Trucks on an average modern box car represent a proximately one fifth of total car cost. To determine wh premium could be paid to improve truck ride quality wo require an analysis of such factors as the sensitivity specific ladings to shock or vibratory damage, the tru riding quality as a source of damage, and the value a potential market of goods within these categories. If vi tually complete protection could be provided against da age due to vertical and lateral accelerations, I believe t railroads would be prepared to pay a substantially high price. With the introduction of long-travel hydrau cushioning devices, the effect of longitudinal action lading has been reduced, affording an opportunity determine more precisely the amount of damage result from truck action.

Maintenance Costs

Freight-car-truck maintenance costs are exceedin low. An analysis of truck costs on a selected fleet freight cars developed that a car set of trucks costs t railway $140 annually—18¢ per 1000 gross ton-miles maintain. The distribution of this cost between the tru components was 55% on wheels and axles; 30% on be ings; 10% on brakes, and 5% on all other componen Because these figures were based on trucks equipped wi waste-lubricated plain bearings and cast-iron wheels, th would undoubtedly be a substantial reduction with truc equipped with lubricating pads and steel wheels.

While railroads are carrying certain fragile commo ties which are subject to damage if truck riding chara teristics are not satisfactory, the greater part of railro tonnage consists of commodities for which present tru designs are adequate. It seems logical to think of two typ of trucks, one adequate to carry commodities which are n easily damaged, and another of more refined design ca able of carrying commodities which require protecti against excessive accelerations or vibratory motions.

If riding characteristics of present trucks are satisfact for loads that are not easily damaged, the features w

;an They Be Specified Now?

ıich we should be concerned are the ability to carry these ıds with safety at speeds up to 80 mph while insuring ıt the truck components are designed to give satisfactory ar life. CN experience with piggyback cars indicates ıt standard trucks can travel safely at high speeds with atively light axle loading. Whether this truck is adeate for full capacity loads at 80 mph under regular opıting conditions remains to be proved.

There is no quantitative evidence that the characteristic l, pitch and bounce actions of existing truck designs conɔute to fragile lading damage. There is, however, a ong feeling that, at certain speeds, a condition of resoɒce involving these three motions causes lading damage. e design of the present spring group has linear characistics which permit resonant conditions at certain speeds :responding to the natural frequency of the spring and d combination. This linear characteristic also makes onstant load rate (weight-to-deflection ratio) for light d heavy loads, resulting in the spring being less shock sorbing at light loads. Practically all fragile loads are ht loads. From a purely theoretical point of view, this ıdition could be improved by use of a non-linear spring supplemental damping such as viscous dampers. It is ubtful if improvements can be achieved only by chang; the present friction damping.

Another needed improvement is provision for absorbing ɜral accelerations before they reach the center plates. is is of particular concern with roller bearings in which ne of the inherent absorption characteristics of plain ırings have been lost. Observation of roller-bearing cks at high speeds indicates a serious tendency to set up ıigh frequency lateral oscillation that could be detrintal to certain commodities.

Center plate resistance has been the object of numerous dies. Although the basic design and characteristic ıvements of the center plate are relatively simple, no isfactory solution has been produced to date. A satis:tory center-plate assembly should have resistance high ɔugh to prevent truck "hunting" and low enough to nimize flange and rail wear on curves. In addition, the :ure of the frictional elements should be such that contant resistance characteristics are provided without servicing or attention over a period equal to that of wheel life. If life of the steel springs and friction snubbers do meet this requisite, it leaves the wearing components in the journal box and the brake shoes as the components with the greatest wear rate and in greatest need of improvement. Evidence has been growing that there is an unequal wear pattern showing up in brake shoes and wheels which is ascribed to unequal braking effort arising from the geometry of the present brake rigging. Experiments presently being conducted with off-tread brakes of the unit type and with new brake rigging designed to equalize the braking force on all four brake shoes could correct this deficiency. Journal bearings are under continuous study and there is every indication that the bearing components will, in the near future, satisfactorily meet railway service requirements.

Specifying Ride Criteria

An engineer of the Canadian National research and development department stated that the resonant conditions reached at certain speeds can cause bounce, pitch and roll. He cited experience with CN refrigerator cars equipped with sprung meat racks at each end (RL&C, Jan. 1961, p 14). In the first half of 1962 227 loads were moved in these cars, with only one load damaged. Of 1,663 loads moved in standard meat refrigerator cars, 69 were damaged. The ability of the sprung racks to damp vertical movement in the car body gave thirteen times better lading protection.

Studies of damage to lading in lightly loaded cars being made by the CN indicate that a non-linear spring with supplemental viscous damping may be the answer. It was explained that an exponential step rate spring could replace the present spring group for test. The road currently is developing a prototype truck with non-linear springs for test. It was emphasized that it is important that truck ride criteria be established. Measurement of the vertical shocks transmitted to the body are not sufficient. Vertical displacement does not measure the motions causing damage. It is felt that vertical velocity might be the proper truck ride criteria.

,auses of Lading Damage

C. A. Naffziger, AAR

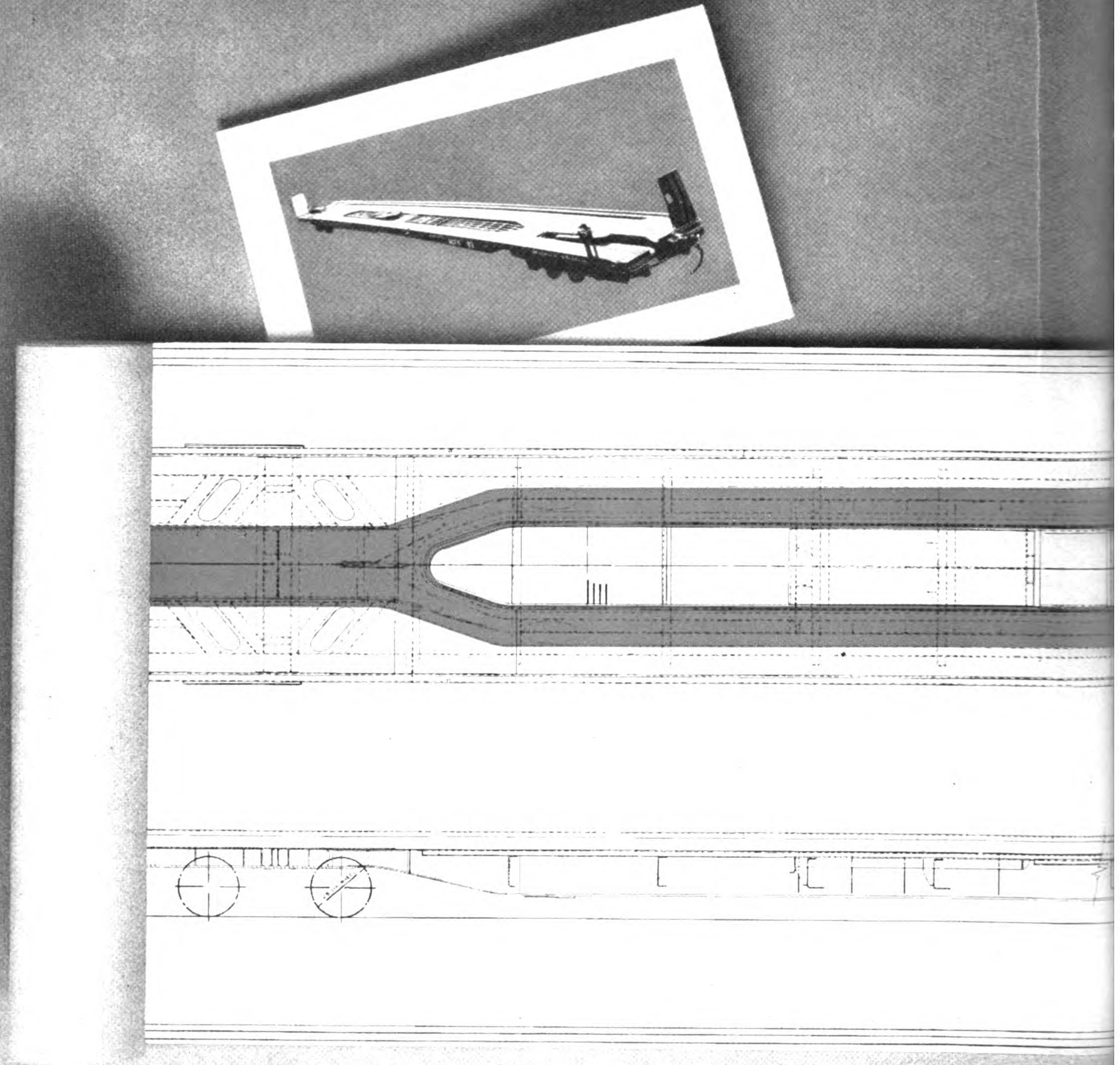
ıile numerous commodities could be involved in lad; damage resulting from rough-riding car trucks, there : four of primary interest:

- Dressed beef on hooks;
- Cotton in bales;
- Newsprint;
- Ceramics, including building and drain tile.

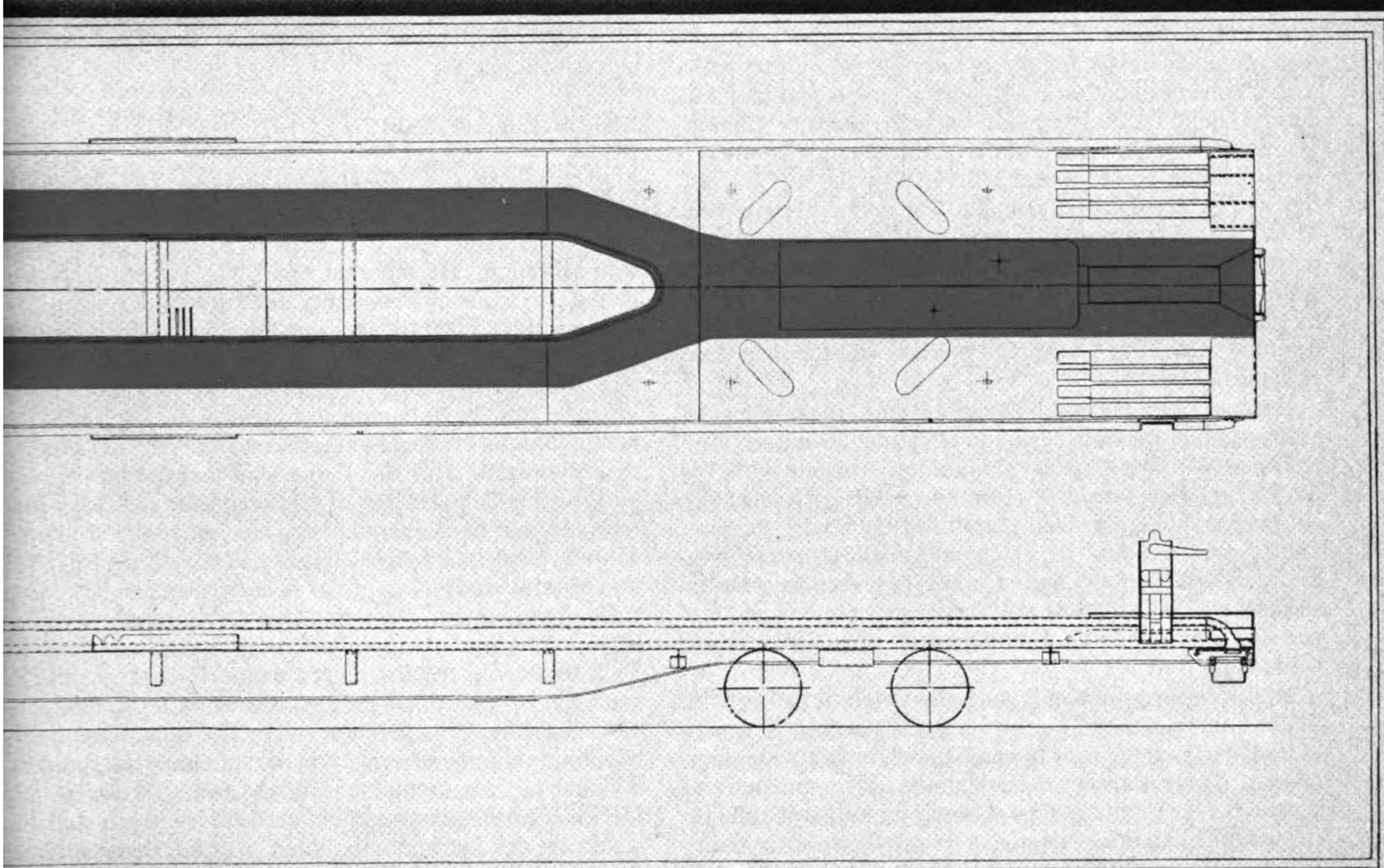
Dressed beef damage results from quarters of beef be; found on the car floor at destination. A decade ago a ɜcial AAR committee reported: "Claims paid by the lroads for damage to dressed beef can be reduced 85% equipping all beef-rail refrigerator cars with modern ;h-speed trucks. Excessive vertical vibration of cars not ıipped with high-speed trucks caused all but a small fraction of damage estimated at $400,000 in an 18-month period.

The Railroad Perishable Inspection Agency notifies car lines of individual cars in which repeated damage has been experienced. Car lines repair or, in some instances, retire such cars. It was found some railroads had installed improper springs in the trucks of refrigerator cars. The matter of improper truck spring installations—substitution of short-travel for long-travel type—was covered in 1960 by an AAR Mechanical Division circular.

It has been reported that downed beef in piggyback trailers was eliminated by replacing springs of 120,000-lb capacity in flat-car trucks with springs of 40,000-lb capacity. *(Continued on page 36)*



GET READY TO ROLL WITH TODAY'



Requirements of Future Trucks

Contin

A combination of circumstances which increased the effect of rough-riding car trucks has served to increase the occurrence of cotton-in-transit fires to alarming proportions. These circumstances involve principally the sustained higher speeds of the diesel locomotive and fork-lift-truck loading with resultant heavier, closely packed loads. In 1946, fire losses amounted to $103,881, with an average of one cotton fire in every 6,496 cars originated. In 1961, such losses were $1,740,588, with an average of one fire in every 610 cars.

A Southern Pacific and Stanford Research Institute study concluded: "There are two major, and approximately equally important, direct causes of fires during railroad shipment of cotton bales—metal sparks and high intensity friction. Fires caused by high intensity friction involve raising the temperature of the cotton (or wood) to the ignition point by heat generated by the rubbing action at a localized area of contact. The cotton fire problem would be non-existent if it were not for the motion imparted to the bales in transit. . . . It would be expected that, if the train were traveling at a higher speed, there would be more movement per unit of time imparted to the car, both the vertical or vibrational motion, and the lateral or swaying motion."

Because older cars with rougher riding trucks are generally used for the transportation of cotton, a Joint Cotton-Railroad Working Contact Committee, working with W. M. Keller, vice president-research, AAR, requested all cotton warehouses to load cotton loosely across the car. During the first year in which this loading pattern was requested on Cotton Credit Corporation reconcentration shipments, U.S. railroads as a whole experienced one fire per 805 cars, while CCC experienced only one fire per 4,245 cars.

Rolls of newsprint paper generally weigh from 1,800 to 2,000 lb each and are loaded on end. Vertical vibration in transit causes the rolls to chafe upon contact with other objects. There is also evidence that the rolls rotate in transit and become damaged by rubbing on adjacent rolls or car walls. In addition, there is a theory that transit vibration may result in a tendency for the paper plies in the roll to equalize any winding tensions. The modern high-speed press requires perfect rolls, or expensive rewinding or rejection with sale of the unusable paper through salvage channels as the result.

Damage to enameled items, such as stoves, refrigerators, washers and dryers, has been experienced in vibrator laboratory tests. While manufacturer's defects are sometimes the basic causes of such damages, these defects are aggravated by vertical vibration in transit. Evidence is conclusive that extensive damage to hollow building and drain tile is frequently the result of transit vibration. Frequencies are such as to bring about a literal disintegration of the tile without evidence of any horizontal shifting of the ladings involved.

Lightly Loaded Cars

S. G. Guins, assistant director research, Chesapeake & Ohio, reported that he has followed lading damage for many years, explaining that it is difficult to correlate damage with vibration. He reported that C&O was experiencing damage to loads of 300 empty steel drums moved in 50-ton cars. It was first thought that this 15,000-lb lading was being damaged by impacts. It was subsequently found that it was actually due to vibration. The cars in this service have now been equipped with two-level springs, the first of 20,000-lb capacity; the second, capable of carrying the fully loaded car. Mr. Guins said that the problem to be solved is light loading of high-capacity cars. He also reported that truck maintenance has not received proper consideration as a source of lading damage. He reported that careful study of a group of cars showed that, after eight years' service, their ride had deteriorated considerably on the basis of lading damage being experienced. Such loss could result from corrosion in springs, loss of capacity, or improper spring applications. Mr. Guinn cited the damage experienced with five cars assigned to handling automobile batteries. Examination of their individual records showed one of the five was responsible for 75% of the damage sustained. It was found that the trucks on this car had been fitted with improper springs. A major portion of the damage was eliminated when standard springs were again installed in these trucks.

Carbuilder's Approach

W. Van der Sluys, P-

An ideal freight truck, according to production people, would be one which practically falls together on assembly, with absolutely no need for any adjustment. The modern freight truck is remarkably close to this ideal, except for the brake application.

Permissible tolerances in brake beams permit enough variation between the locations of the truck lever and the brake head to allow piston travel to vary by as much as 4½ in. Side frame and wheel tolerances will increase this variation. Railroad inspectors properly object to using the slack adjuster to compensate for these variations beyond a plus or minus one hole range. Consequently, carbuilders are faced with making individual pull rods for individual cars. Cushion underframe cars have complicated this problem, because the heavy center plates limit the range of location of truck levers. This can hardly be considered a good production arrangement. In addition, there is constant trouble with the method of attaching the pull rod to the truck-brake arrangement. If the pull rod passes over the bolster to a truck lever, it is difficult to keep it from rubbing on the top of the bolster. If a cross lever is used inside the bolster, this is even more of a problem, because it is difficult to keep it from drooping so it rests on an axle. Even though adjustments are made in the shop so that these conditions do not exist on the shipping track they frequently occur very shortly thereafter. If the bottom rod connection between the truck levers could be returned to a position under the bolster and the dead lever could b

onnected to the car body, potential interference would ot only be eliminated, but also the tendency for truck cewing during a brake application. This would also be ue if one or more of the package brake systems now vailable were to become an accepted standard.

igh-Capacity Problem

Carbuilders' future needs with the trend to the high-apacity, high-cube car, requires clarification of the un-ertain situation involving high-capacity trucks. Although 6-in. wheel, two-axle trucks are now permitted for 90-nd 100-ton cars, people concerned with rail shelling con-der these wheels badly overloaded. If these trucks are be changed to 38-in. or 40-in. wheels, any car design hich makes use of all presently available space will have be modified and retested. There is also considerable ncertainty as to dimensions of six-wheel trucks which ave been proposed for the very high-capacity cars. This akes it very difficult to develop a new standardized pro-uction design of car.

The trend toward the high-capacity car is also produc-ng a need for some means of improving the rolling sta-ility of high center of gravity cars. Many cars are approaching, in some cases passing, the limits which were normally considered maximum for center-of-gravity height. This applies to piggyback cars, high-cube covered hopper cars, and container cars such as the one recently built for the Santa Fe with a 13½-ft inside height. If these car bodies are to be mounted on trucks with long-travel springs, some investigation should be started toward the possibilities of reducing rolling tendencies.

Efficient structural designs result in lighter weight cars, which frequently brings up the problem of the empty-load brake. Even though the operating department might achieve considerable savings over the life of a car because of its lighter weight, it is still difficult for the mechanical department to justify a penalty of up to $900 per car for an empty-load brake. To realize the full potentialities in lightweight car designs, there must be an accepted method for reducing the cost penalty imposed each time the light weight of the car drops below, for example, 52,800 lb for a 70-ton car. If only the first cost is looked at, it becomes necessary to eliminate an extra 11,000 lb of low carbon steel to compensate for the extra cost of the brake system. After already making a major weight reduction to arrive at the 52,800-lb figure, removing an extra 11,000 lb is well nigh impossible.

Truck Manufacturer's Problems

C. E. Tack, ASF

Configuration of the car body, type of lading, location of enter of gravity above the rail, and location of center of ercussion are large factors influencing riding qualities of reight cars. Because there is no single standard freight ar, there can be no single standard freight-car truck or uspension system which will give a completely controlled ide under all operating conditions. Freight-car trucks and uspension systems represent a number of compromises:

- Cost. First cost must be kept low and maintenance osts must be minimized. Basic components should last for he life of the vehicle.
- Weight. Basic components should be as light as pos-ible, consistent with safe and trouble-free service.
- Riding quality. Riding quality is a term which covers wide range of performance characteristics. Riding qual-ty has been judged in the past in terms of "lading damage actor," an empirical method of assigning values to trans-nitted shocks of relatively low frequency (10 cycles per ec maximum) and intensity (¼ g to 1 g or 1¼ g). Higher requency shocks (of lower intensity) have largely been gnored in the development of freight-car trucks.

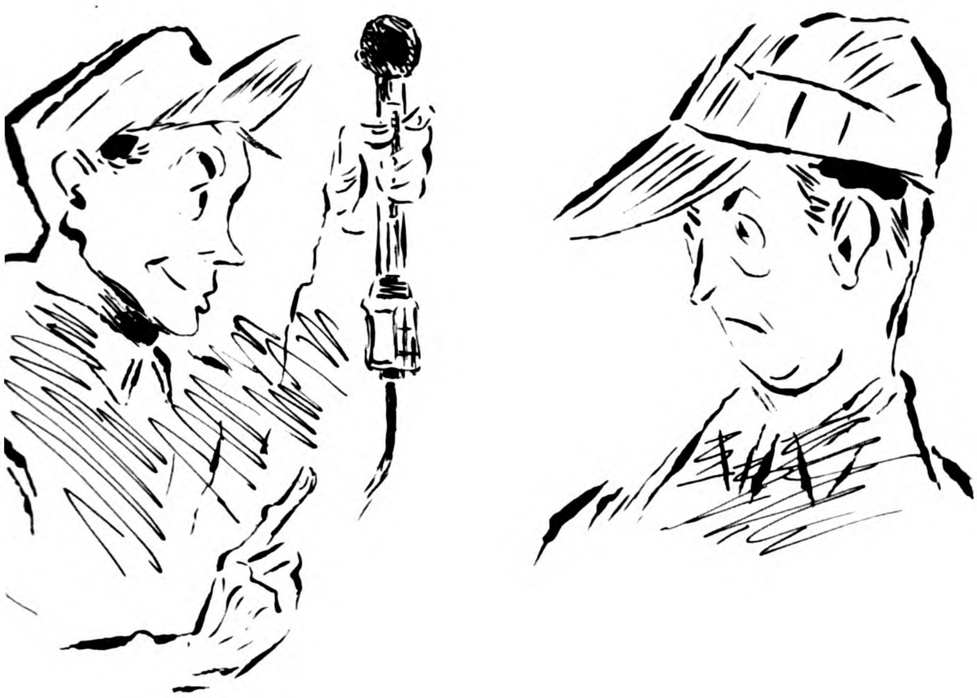
Further improvement in ride quality might require con-ideration of more sophisticated and expensive suspension systems. Just how much is an improvement in ride quality worth in dollars? How much lading damage can be traced directly to truck or suspension design? It may be more practical to design special suspension systems for special cars and commodities in order to avoid high cost for trucks which handle bulk items. It is important that values be placed on the degree of improvement desired. It is easy to visualize the use of more sophisticated suspension systems; all are associated with increased weight and increased initial cost. Another drawback is the problem of operating such systems in interchange, providing for their repair.

Bulk Commodity Service

J. H. Miller, chief mechanical officer, Quebec, North Shore & Labrador, commented on the possibility that, eventually, there will be one type of truck for cars designed to handle fragile lading and another for bulk commodity cars. Mr. Miller discussed the trucks on the 3,000 100-ton gondolas used in his road's ore-handling service. He stressed that the requirements of the running gear on QNS&L cars in bulk mineral service are simplicity, ruggedness, and reasonable behavior of the vehicle on the track. Mr. Miller said that six-wheel trucks were considered for these cars, but were found to involve added capital and maintenance. He said that the trucks chosen represent 15% of the car's cost without wheels, axles and bearings, and 26% with these wearing components.

F. Peronto, executive vice-chairman, AAR Mechanical Division, discussed the assignments of the recently formed Car Design Task Force. Future truck requirements will be one of their major considerations. Mr. Peronto said that it has been established that lubricants alone cannot give satisfactory center-plate performance. It has been decided that a lubrication liner (a separate piece) will be necessary between the body and truck center-plate surfaces. To make this possible, steps are already being taken to deepen the center-plate depression by ½ in. Another phase of truck performance is maintenance. Mr. Peronto discussed the steps which have been taken to insure that the proper springs and snubbing devices are applied to car trucks.

From the Diesel Maintainer's Note Book



How the Hydrometer Fooled Bob Brown

ʾy Gordon Taylor

Bob Brown, a diesel maintainer at enterville, was wearing a rather roubled look as he entered the electrical shop. "What's bothering you," sked Sam Sparks, a fellow maintainer.

"This," said Bob, "is one of those ays when I might as well have stayed ome. You know the kind, when even imple things seem complicated."

"You must have a case of diesel aze, as Doc Watts would say. Tell ie what's wrong?"

"It's like this," said Bob. "I've always thought that the electrolyte of a ully charged storage battery would how a high gravity reading when hecked with a hydrometer."

"Sounds right to me," replied Sam; What's raised your doubts on that oint?"

"It's Switcher 750," said Bob. "A ouple of days ago it came into the hop with a weak battery which was ıot charging because of a blown fuse. We 'shop charged' the battery enough to return it to service and replaced the blown fuse, sending the unit back into service with the battery charging. I've checked the battery a couple of times since to be certain it's continuing to be charged. The battery charging meter on the locomotive shows the battery is being charged and the battery has power to crank the engine. That tells me the battery is being charged and in good condition. But the hydrometer refuses to back this up. A test with it shows less than 1.200 gravity. I'm about to change my mind that hydrometer readings are a reliable indication of the state of charge of a battery."

"Unless some of the laws of electrochemistry have changed, the charge of a lead-acid battery is still properly indicated by hydrometer readings," said Sam. "That switcher should be at the service track for fuel in about 30 min, so let's both check the battery to see what's wrong."

Sam and Bob met the switcher and found that the battery charging meter was registering "charge." When they took a hydrometer reading, it showed the gravity to be a bit less than 1.200.

"Something does seem to be wrong," said Sam, "but first get another hydrometer; I think this one is lying."

Bob got a spare hydrometer and, when the battery was tested, the gravity reading was 1.260. "What do you know about that," exclaimed Bob; "the first hydrometer looks perfect."

"Well," said Sam, "take the float out of the barrel and let's see why it doesn't rise higher."

When the float was removed from the barrel, it was found that the glass stem was cracked, permitting acid to get inside the stem and collect in the enlarged or weighted section at the bottom. This increased the weight of the float so it would not rise high enough to indicate a correct gravity reading. The hair-line crack was not noticeable when the float was viewed through the outer glass barrel.

"Now," said Sam, "you can see the importance of standing firm in what your experience has taught you to be correct. You believed you should be getting high readings from the hydrometer if the battery was well charged. The battery showed that it had plenty of muscle by the way it cranked the engine, and the charging

his series of articles based on actual experiences of men who operate and maintain diesel-electric locomotives.

ammeter showed the battery was getting the kind of food that makes muscle for batteries. Therefore, the hydrometer became suspect and needed to be compared with another one. The same thing holds true with voltmeters, ammeters, and other test instruments. If they give readings that appear to be incorrect, then they should always be compared with a standard instrument that is known to be correct."

Just then the loud speaker sounded a call for Sam and Bob to go to the west end of yard to meet Train 74, a hot-shot freight, arriving shortly with the two trailing units in trouble. The units were either to be restored to service, or relief units would have to be provided in order to continue the trip east.

They hopped into the "trouble car" and quickly drove down to west yard where shortly they could see No. 74, headed by four GP-9 units, drifting down grade. The appearance of the exhaust stacks indicated that the engines on all four units were running, causing Bob to remark "that's a break for us; it shouldn't be too difficult to get all those horses back on the job."

When they climbed aboard the lead unit, Engineman Mike Casey greeted them with: "We were having a good trip until we got to Signal Hill when I noticed we were losing power. All the engines were running, but the two rear trailing units wouldn't speed up when the throttle was advanced on the lead unit. By that time we had stopped near the interlocking tower. I told the operator to phone the diesel shop, telling them to have someone meet us and that, if we were at all successful in restoring power, we would proceed toward Centerville.

"We checked several things, then decided that since both trailing units had the same kind of trouble at the same time, the most likely cause of trouble would be a defective jumper cable between the second and third units. We changed the jumper cable and, sure enough, we got the third unit back to work. The fourth unit engine still would not speed up. All fuses and circuit breakers seemed to be OK, so we quit looking. We proceeded with three units working.

"Now here we are about an hour late, with the fourth unit just going along for the ride. I hope you can wake it up. The next crew will need all four units to handle this train out of here."

"Well," said Bob, "you've just handed us a package of trouble." Turning to Sam, he continued: "What will we do with it and where do we start? The most likely cause as I see it is something interfering with the ER relay which brings in the governor speed control. The ER contactor is activated by the closing of the 'Engine Run' switch with energizes Wire 16 in the trunk control cable. A tap from Wire 16 activates the ER relay which, in turn, energizes the speed solenoids in the various units."

"That sounds good," said Sam. "It was probably a bad connection in the jumper cable that caused the two units to fail. Now that the new jumper cable has restored the third unit, we are still left with the fourth unit in trouble. There is probably something wrong on that unit."

"How about the jumper cable between the third and fourth units?" asked Bob. "Do you think it could be faulty?"

"I hardly think so," answered Sam; "the odds are against two jumper cables on a four-unit locomotive failing at the same time. Just to be certain, let's switch the jumpers at the ends of the third unit to see what happens."

"Why not use the spare jumper cable between the third and fourth units?"

"That spare jumper is no good," said Sam. "Remember that Mike Casey had to replace it to get the third unit back to work."

"That's right. Remember that I told you this wasn't my day."

The two maintainers switched the jumper cables connecting the two rear units, but that solved nothing. The governor control on the third unit continued to work, but the engine on the fourth unit stayed at idle.

"We've missed something on that fourth unit," said Sam; "it's just that the engine on this unit fails to get the 'speed up' message through the control system when the throttle is moved. Let's follow our regular check sheet as Doc Watts would do. We'll check those things that are most likely to cause the governor to fail to pick up engine speed when the throttle is opened.

"First, how is the ground relay? Is it tripped?"

"No, it's not," said Bob.

"Is the Isolation Switch in 'Start' position?"

"No; it's in 'Run'," replied Bob.

"Now," continued Sam, "ordinarily we would check the 'Engine Run' switch to see if it is in 'Off,' but we know it's in 'On' position, otherwise the other engines would not speed up when the throttle is opened. The same thing can be said of the Control and Fuel Pump switch. We know it must be 'On' or closed.

"The PCS light is not on, neither is the NVR light. That eliminates the pneumatic control switch. It also eliminates a 'No Voltage' failure. We'll have to look for something else.

"We have just about completed the list of most likely suspects," continued Sam, "except for the small cable that plugs into the governor. How about it?"

"Don't worry about it," Bob responded; "I noticed it was in place as I passed around the engine. It looks good."

"That may be like the hydrometer float; it may look good, but is it good? Does it have a good tight connection? Check to see if the plug's locking ring has pulled it into tight contact in the receptacle."

Bob took hold of the locking ring and, to his embarrassment, found it loose. When the ring was tightened the trouble was over. The governor could now get the message from the throttle switch to tell the engine to get busy. The case could now be closed. Cause: a defective jumper cable connecting the second and third units plus a loose governor cable on the fourth unit.

"I'm sorry I overlooked that loose connection," said Bob. "I guess this winds up our job out here."

"No, it doesn't. There is one more thing to do," said Sam. "We'll not send this locomotive out with a spare jumper that is defective. Hop over to that local freight unit that just pulled in on the next track and borrow its jumper cable. We'll take the bad order cable back to the repair shop and supply a good cable for the local's unit when it pulls into the service track."

On the way back Bob said: "Sam, I have surely learned the cause of what you called 'diesel daze.' It is caused by lack of complete attention to what you are doing. In this business, you have to be sure that things are exactly as they appear to be. Also, if test instruments appear to give incorrect readings, then demand that they prove themselves."

Understanding Semiconductors

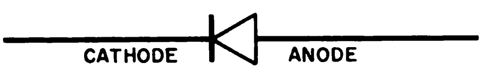
Part 2—Silicon Diodes

By **R. L. Brittin**

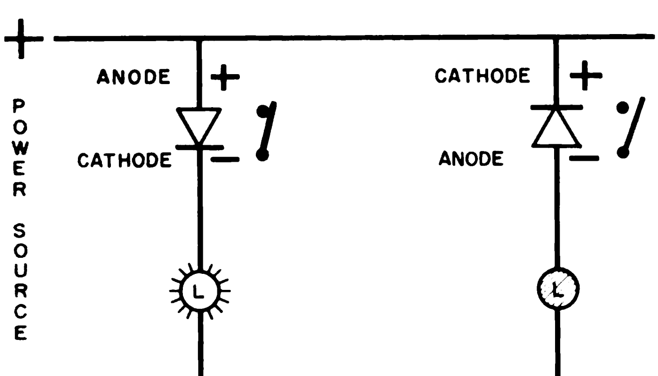
One type of semiconductor of increasing importance in car and locomotive applications is the silicon diode. It is not intended to explain here *why* diodes work, but rather to tell *how* they work. The result will be a basic working knowledge of their functions. Many textbooks are available to explain the theory of diode operation.

The diagrams used for explanation may be used as the basis for a series of inexpensive experiments requiring only the following: one 6-volt lantern battery, one 6-volt lantern bulb, and one diode having a rating of no less than 0.5 amp and 50 volts PRV. Such a diode costs approximately $1 and could be any one of the following: International Rectifier Type SD-50-91 or SD-91-A, or General Electric 1N1217. The next installment will present a similar explanation of transistors in which the battery and bulb may again be used.

A diode consists of an anode and cathode. When the anode is more positive than cathode, the diode conducts



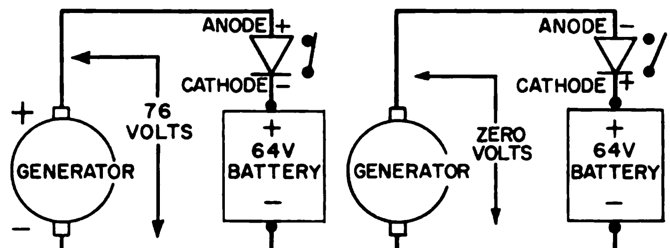
Symbol for diode should become familiar to electrical maintenance men because more of these devices will be found on wiring diagrams.



Installation of diode in circuit determines how it will function. It can perform as an open or closed switch. Switch symbols are shown beside diodes which will function as an ordinary switch would.

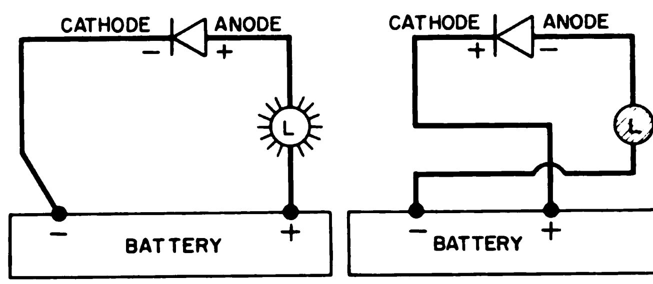
and resembles a closed switch. When the cathode is more positive than anode, the diode will not conduct and resembles an open switch. It would be impractical to physically reverse a diode in order to open and close a circuit. Consequently, applications are chosen where the polarity will automatically reverse as needed. The battery blocking diode represents such an application. Its purpose is to replace the reverse current relay on battery charging generators.

When the generator voltage is higher than battery voltage, the anode is positive in relation to the cathode, the diode conducts, and the battery receives a charge. When



Reverse current relay function can be achieved with silicon diode.

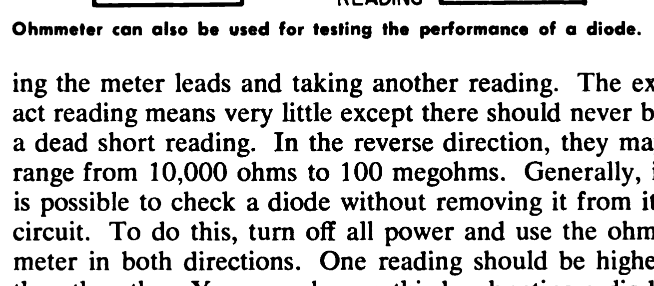
the generator voltage is less than battery voltage, the anode assumes the negative polarity of the battery because of the low resistance of the armature and the diode becomes nonconductive to prevent discharge. Silicon diodes can be



Complete test of diode can be made with lamp and 6-volt battery.

tested with a 6-volt battery and lamp. The diode *must pass both tests:* with negative to the cathode, the light must burn; with positive to the cathode, the light must be out.

An ohmmeter can be used by taking one reading, revers-



Ohmmeter can also be used for testing the performance of a diode.

ing the meter leads and taking another reading. The exact reading means very little except there should never be a dead short reading. In the reverse direction, they may range from 10,000 ohms to 100 megohms. Generally, it is possible to check a diode without removing it from its circuit. To do this, turn off all power and use the ohmmeter in both directions. One reading should be higher than the other. You can observe this by shunting a diode with a resistor and making the "ohmmeter test."

If the circuit uses several diodes in series, they cannot be tested as a group; each must be checked separately. For this reason, selenium rectifiers cannot be tested in this manner because they usually have a number of cells in series. Silicon devices generally fail shorted.

[To Be Continued]

Second of a series of articles explaining basic semiconductor operation and testing for Illinois Central electrical department employees. Mr. Brittin is traveling electrical inspector.

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted by LMOA members, those sent to the Editor by other readers are welcomed and published.

Checking Shorted Motors

When wheel slips persist and no other cause has been found, what method can be used to tell if a traction motor has internally shorted main field coils causing the slips? How can it be determined which traction motor to remove on a GP-9 unit?

Within the past two years one railroad has experienced approximately fifteen cases of wheel slip on GP-9 units due to internally shorted main field coils on D 37 traction motors. The main field coils become loose, causing the mica insulation that separates the two 8-turn coil layers to fret and chafe until the coil layers short at some point. When this occurs, the WS 24 or WS 13 wheel-slip relay picks up. Often the maintenance shop has been given no clue as to which relay picked up. Even after knowing, the problem is how to tell which truck or traction motor to remove, because the two traction motors are in different trucks but operate in same circuit when in series.

If main fields are shorted, a voltage drop (impedance) test has been welcomed by maintenance forces due to its simplicity, speed, and accuracy in pointing out the offending motor. Test steps are:

1. Place reverser in neutral and lock. On electromagnetic reversers, block or cut out all traction motors.

2. At the reverser, apply wire jumpers to connect F2 to FF1, FF2 to F4, and F1 to FF3 or any other combination that will connect all traction motor main fields in series with one another. Polarity seems to make no practical difference.

3. Apply 120 volts alternating current fused for a minimum of 30 amp across F3 and FF4 and, using an a-c voltmeter, read the voltage (impedance drop). Then read voltage across F1-FF1, F2-FF2, F3-FF3, and F4-FF4. The sum of the total voltage drop across all the 16 coils in series does not equal the sum of the voltage drops across each of the individual traction motor field connections at the reverser due to various cable and connection losses. All readings across individual traction motor fields should be within 10 to 15% of each other. As this is strictly a comparison test, it allows for production differences in motors of same type and makes possible checking of the fields of motors of different types such as D 27, D 37, D 47, and D 57. A motor with one completely internally shorted main field coil will usually show a voltage drop 25% lower than the others. Remember that the short can be located so that all or only a few of the turns of one or more coils can be shorted. If only three or four turns of a coil are shorted, the through-cable wheel slip system does not recognize it.

To illustrate the above procedures, the following data is from actual te[sts]. Each test requires 30 min or less.

Case 1. Normal readings. Whe[el] slip trouble was found on a locomotive. It developed that it was not d[ue] to traction motors and the motors we[re] not removed. Readings across th[e] four motors were D 47 - F3 to FF3, 23 volts; D 37 - F1 to FF1, 25.7 volts; D 37 - F2 to FF2, 25.2 volts; D 37 - F4 to FF4, 24.2 volts. I was 23 amp.

Case 2. Readings taken were D 27 - F1 to FF1, 26 volts; D 37 - F2 to FF2, 15 volts; D 37 - F3 to FF3, 25 volts; D 27 - F4 to FF4, 26 volts. Shop tear down inspection verified No. 2 traction motor had shorted main fields. No current or total voltage drop measurements were taken.

Case 3. Readings taken were D 3[7] - F1 to FF1, 27 volts; D 37 - F2 to FF2, 29 volts; D 37 - F3 to FF3, 18 volts; D 37 - F4 to FF4, 27 volts. Shop tear down inspection verified that No. [3] traction motor had shorted main fields. Current was 27 amp (no total voltage drop taken).

In making these tests a new factor is being introduced into the normal direct-current relationship of Volts = Current × Resistance ($V = IR$) for the main field coils. This new factor is called impedance (Z) and is introduced into the circuit by applying alternating current. The new relationship is:

$V = IZ$, where

$Z = \sqrt{R^2 + (X_l - X_c)^2}$

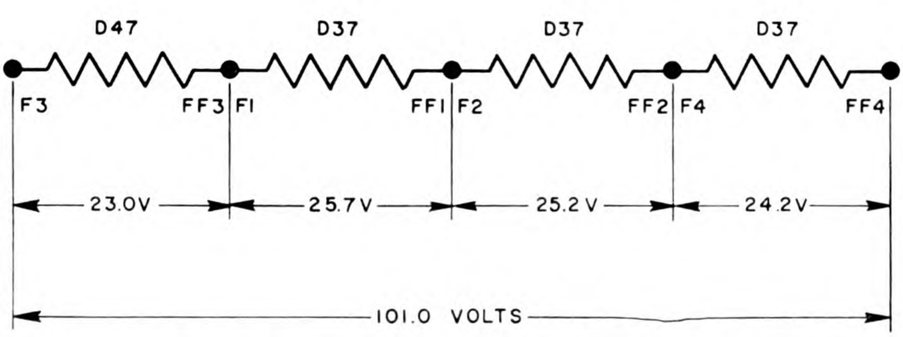
R = Resistance in ohms (which is exceedingly low compared to X_l and X_c.

X_l = Inductive Reactance (which is high in relation to X_c).

X_c = Capacitive Reactance.

It is the X_l in the circuit that normally holds the current down to about 30 amp, depending on how many coils are shorted. The decrease in number of turns in the field coils due to short effectively reduces the inductive and, to a much lesser degree, the capacitive reactance. The voltage or impedance drop (IZ), neglecting the resistance and the somewhat larger factor X_c becomes close enough to be almost proportional to IX_l (at least good enough for the type of test under discussion). Obviously, this test, with modifications, can be made valid as a comparison test for shorted main field coils on traction motors under any type of unit.

J. R. Mitchell, assistant electrical engineer-equipment, Illinois Central.



Checking individual motor voltages at the reverser has proved to be effective in detecting shorted field coils. Motors on this locomotive were satisfactory. Current involved was 23 amp.

r Orders

(Continued from page 7)

rly indicated as yet."

Shipment of new freight cars in 1963 is ected to about equal that of 1962, with ntinuing trend toward special purpose ipment," C. M. Wright, general manager ailway and industrial cars for Bethlehem l Company, stated. "Bethlehem is re-iding to the market trend with more ihasis on research and develpment and investigation of transportation require-its and economics," he said.

Ir. Wright explained that orders char-rized by comparatively smaller indi-ial lots of high-cube cars, bulk commodi-ars, and specialized flat cars are expected nake up the future order pattern."

Our market in the coming year should n insulated box cars and specialized box with cushion underframes, covered per cars and piggyback cars," says G. Green, vice president-marketing of Pull-1-Standard. "Of course, there will be ers for other types of cars, but it is an-bated that the bulk of car orders will be n these types of equipment. The trend larger capacity cars should continue. re probably will be more and more 60-ft cars, covered hopper cars whose cubic acities will range between 4,000 and)0 cu ft, and hopper cars and flat cars greater length and capacity. There is ie limit to larger and larger cars, but do not anticipate this limit will be ched in 1963. We now have many new igns on the drawing boards. Principally, se new developments are in three prod-lines—cushion underframe box cars, ered hopper cars, and container cars.

Probably one of the most significant elopments of our research and develop-nt program in recent years has been the droframe-60 underframe. Most of the car orders we received during the past r have been equipped with this gear and ias made possible the design of certain es of special cars that otherwise would be feasible without adequate cushion-."

The growing importance of high capacity s evident from an analysis of last year's orders. Over half the open-top hoppers, iost half of the covered hoppers, and out 60% of the tank cars were to be car-l on 100-ton (6½ x 12-in.) trucks. About % of the refrigerator cars and 5% of the cars ordered were also of nominal 100-capacity. About 50% of the box cars l 20% of the refrigerator cars were to equipped with cushion underframes. The wing popularity of the cushion under-me for flat cars—conventional, piggy-k and heavy duty—was evident from lers placed.

Latest AAR figures show that the Class I lroad revenue freight-car fleet totaled 63,290 cars on November 1, with aver-carrying capacity of 56.25 tons per car. is compares with a fleet of 1,641,033 cars h 55.70 tons average carrying capacity November 1, 1961. There were also 1,297 privately owned revenue freight s, including railroad-controlled private rigerator cars, reported in service on ass I railroads on November 1, 1962, as npared with a total of 203,894 such cars November 1, 1961. Approximately 66,000 additional privately owned cars were, on those dates, in possession of owners or railroads other than Class I. The ownership of private cars was reported as 269,926 on January 1, 1962, and 275,090 on January 1, 1961. Class II railroads and switching and terminal companies owned approximately 32,000 revenue freight cars which were used in interchange service on January 1, 1962, compared with 32,104 on January 1, 1961.

Personal Mention

Canadian National. — *Montreal:* J. N. McConnell, general foreman, appointed supervisor of motive power, Point St. Charles diesel-electric shop. W. Potolicki, assistant engineer-car, St. Lawrence region, promoted to engineer-car.

Chesapeake & Ohio.—*Huntington, W. Va.:* George E. Nant appointed electrical supervisor (system). Billy L. Stevens appointed electrical inspector, succeeding Mr. Nant.

Chicago & Western Indiana.—*Chicago:* J. M. Phillips appointed master mechanic, in charge of locomotive and car departments.

Erie-Lackawanna. — *Cleveland, Ohio:* L. G. Robinson appointed assistant chief mechanical officer. *Scranton, Pa.:* David M. Huggins appointed master mechanic, succeeding Mr. Robinson. *Hornell, N.Y.:* Robert C. Rose appointed road foreman of engines, Susquehanna Division. *Meadville, Pa.:* Eugene W. Ludden appointed road foreman of engines, Mahoning Division, succeeding Mr. Rose.

Monon. — *Lafayette, Ind.:* R. L. Justice, superintendent car department, appointed master car builder. J. F. Justice appointed master mechanic.

New York Central.—*New York:* R. E. Doyle appointed chief mechanical engineer. Formerly district supervisor maintenance-mechanical at Detroit, Mich. A. E. Jaeckle appointed mechanical engineer-special car equipment.

Norfolk & Western. — *Bluefield, W. Va.:* Thomas C. Moore appointed assistant road foreman of engines, Pocahontas Division, succeeding S. V. Arrington, retired. *Shaffers Crossing, Va.:* Christian A. Hoeser appointed assistant roundhouse foreman (electrical), succeeding Mr. Moore. *Lamberts Point, Va.:* Billy B. Johnson appointed assistant electrical foreman, succeeding Mr. Hoeser. *Roanoke, Va.:* John V. Euton appointed electrical inspector, succeeding Mr. Johnson. Mr. Euton formerly shop inspector at Portsmouth, Ohio.

Southern.—*Washington, D.C.:* A. M. Cary, assistant chief mechanical officer-maintenance, appointed assistant chief mechanical officer maintenance-locomotives. K. L. Pollitt appointed assistant chief mechanical officer maintenance-cars. Mr. Pollitt for-

merly manager Chattanooga diesel shop. *Atlanta, Ga.:* EUGENE H. SCHILD appointed general diesel supervisor. *Chattanooga, Tenn.:* ERVIN CANTRELL, JR., appointed process engineer, succeeding Mr. Schild. LELAND R. GOLDSTON, foreman, appointed general foreman, succeeding Mr. Cantrell.

Southern Pacific.—*Sacramento, Calif.:* JAMES K. EDWARDS appointed assistant superintendent, mechanical department. Formerly assistant superintendent, mechanical department, southern district, at Los Angeles, Calif. J. A. BURKE appointed district master car repairer, succeeding FRED KIMBALL. E. A. PALMER appointed master car repairer. *Los Angeles:* JAMES W. MCLAUGHLIN appointed assistant superintendent, mechanical department, succeeding Mr. Edwards. J. C. RUBENS appointed assistant master mechanic, Western Division. *San Francisco:* FRED KIMBALL appointed general master car repairer, succeeding Mr. McLaughlin. R. L. THIELEN appointed traveling diesel supervisor; W. J. PRESHO, industrial engineer; BRUCE MCDONALD, research engineer; J. HANSEN and W. E. THOMFORD, assistant engineers, car construction.

Supply Trade

Perry T. Egbert

ALCO PRODUCTS, INC.—*P. T. Egbert*, chairman of the board and former president, retired. *Walter B. Meyl* appointed locomotive and diesel engine renewal parts representative, northeastern United States, with headquarters at North Bergen, N. J.

UNION ASBESTOS & RUBBER CO.—*Richard A. LeBeau* appointed district sales manager, Equipment Specialties and Equico Hand Brake Divisions, Chicago and St. Louis area. *Stan M. Haigh Co.* named sales representative for the divisions, covering Minneapolis-St. Paul area.

HALLIBURTON CO.—*Paul D. Howard* appointed sales manager, Freight Master Division, with temporary headquarters at St. Paul, Minn. Mr. Howard formerly railroad market manager, Reflective Products Div., Minnesota Mining & Mfg. Co.

TIMKEN ROLLER BEARING CO.—Cleveland office of Industrial Bearing, Steel & Tube and Railway divisions moved to Shaker Building, 3645 Warrensville Center Road, Cleveland 22. *H. L. Hexamer* is district manager, Railway division there.

CLEVELAND GRAPHITE BRONZE, DIVISION OF CLEVITE CORP.—*R. W. Pittman & Associates*, 708 East Hermosa Drive, F

Calif., appointed West Coast repre-ve for railroad products, including ꞊ cartridge journal bearing for freight nd replacement bearings for EMD engines.

VOOD-WAKEFIELD CO. — *Roger 'te* assigned New England sales terri-principally working out of Gardner, Mr. Monette will also cover New Area under *Warner B. Cornwall,* dis-manager, and assist Bryant Burns in lelphia and Eastern and Western ylvania territories.

ION CORP.—*Gerald Q. Bogner* heads les division established at 1220 Wood-Heights Blvd., Ferndale 20, Mich., to railroad industry with Wessonmetal les and new line of wheel and axle g tools.

NAFLUX CORP.—*Gary C. Robin-* amed manager, southwest district, Ma-; Testing Laboratories Div.

FALO BRAKE BEAM CO.; UNIT CK CORP.—*Charles R. Culp* appoint-gineer of research and development, headquarters in New York. Mr. Culp ꞊rly with New York Central System ACF Industries, Inc.

NDON EQUIPMENT CO. — *L. L. ꞊, Jr.,* elected president, succeeding *Packard,* now chairman. *Robert H. ꞊,* formerly associated with MacLean Lock Nut Co., elected vice president—

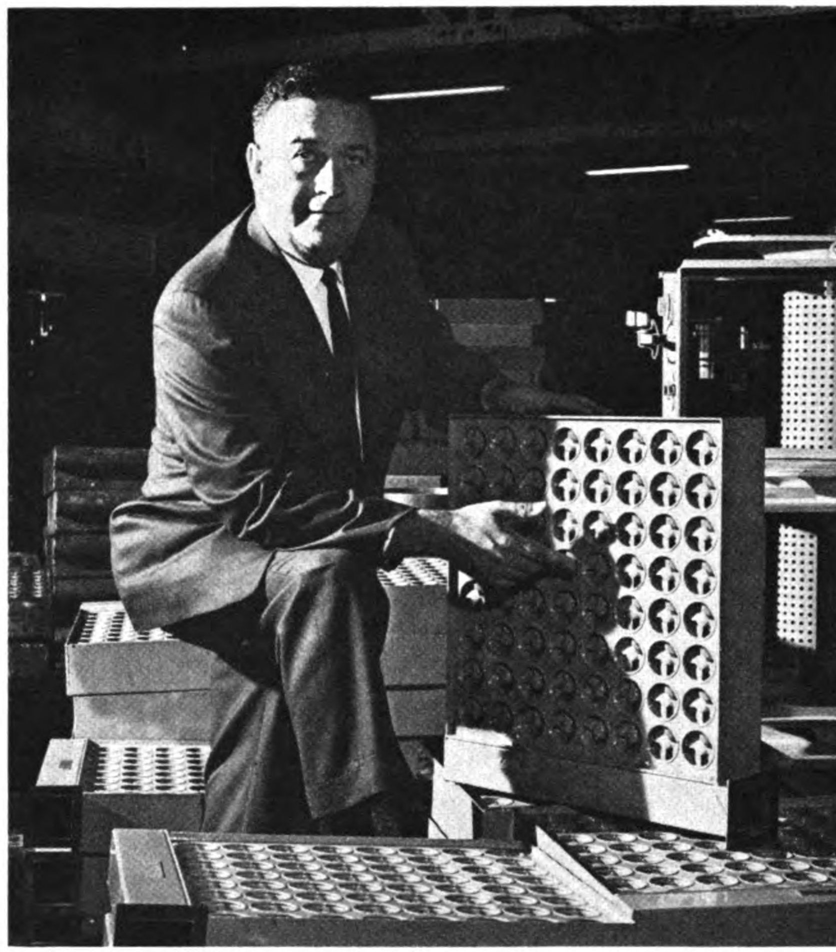
ERICAN MANUFACTURING CO., IC TRAVELER DIV.—*John C. Souders* inted general sales manager, in charge stribution and sales of all electric and ianical transport refrigeration systems. . *Warner* appointed midwest regional iger at 555 West Road, Lombard, Ill.

/NSEND CO.—*W. B. Causey* appoint-ngineering manager, Technical Sales Service Department, and *B. F. W. e* western sales representative, Cherry t Div., Santa Ana, Calif.

JNGSTOWN STEEL DOOR CO. — *iam C. Hurson,* vice president of Camel ; Co., wholly-owned Youngstown sub-ry, elected assistant vice president of ngstown Steel Door Co.

IES SERVICE OIL CO. — *Louis M. ımning,* lubrication engineer, St. Paul di-n, named sales service engineer, Rail-Sales Department, at St. Paul, coordi-ıg sales in Milwaukee, Des Moines and Paul divisions and reporting to *Martin her,* manager of railway sales, in New ‹.

꞊ INDUSTRIES, INC. — A hydraulic ioning device developed by Bendix for ication to sliding sills used on freight to give lading protection (RL&C, Oct.), p 12) has been acquired by ACF. ılved are Bendix Aerospace Division's arch and test data, tooling, inventory, patent rights, according to *W. T. Tay-* ACF chairman. The newly acquired , called the Freight-Saver, will be man-ıtured by ACF's W-K-M Division in ıston, Tex., in sizes suitable for appli-on to sliding sills on various types of .



Advertisers Index

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following page 46.)

1. VIBRATION/SHOCK/NOISE CONTROL. Bulletin 905 describes range of Lord vibration/shock/noise control products. Lord Manufacturing Co.

2. PLYWOOD. "Facts About Plywood," a pocket size digest explains briefly what DFPA plywood is and what it will do. Douglas Fir Plywood Assn.

3. CUSHIONED CARGO. Booklet describes design and application of the National 3C Gliding Sill for new and existing freight cars. National Castings Co.

4. EPOXY PELLETS. Bulletin describes electrical, chemical and mechanical characteristics of custom shaped Epoxy E-Form pellets for encapsulating and bonding applications. Epoxy Products, Inc.

5. SOLID LUBRICANT. Tables and graphs in Bulletin 13 present test data on corrosion resistance and wear life of Mol Spray-Kote, an aerosol dispensed solid lubricant. Alpha-Molykote Corp.

6. SOLID LUBRICANTS. Selector chart (Bulletin 138) describes constituency, properties, operating characteristics, and methods of application for 21 different lubricant formations. Alpha Molykote Corp.

7. CAST NYLON PARTS. Bulletin Mc-3-1 indicates variety of sizes and shapes now possible in MonoCast nylon. Illustrated castings weighing up to 100 lb. Polymer Corp.

8. FLOODLIGHTS. Bulletin 61-350-5 describes new Mercury master general-purpose floodlights, Type MFB-10. Westinghouse Lighting Div.

9. EX-TEN STEEL. Folder (ADUCO 02051) contains engineering data and mechanical properties of USS Ex-Ten high strength steels, including new 65,000 psi yield point 65 grade. United States Steel Corp.

10. VENTILATING UNIT. Portable M-S-A Lamb Air-Mover designed for large volume blower or exhaust operation, described in Bulletin No. 0910-1. Capacity, from 800 to 5,160 cfm. Mine Safety Appliances Co.

11. FUEL CLEANLINESS GAGES. Go-No-Go fuel cleanliness gages for positive cutoff of fuel flow when fuel is contaminated above a predetermined level with water and/or solids discussed in Bulletin No. BFD-247-A. Bendix Corp.

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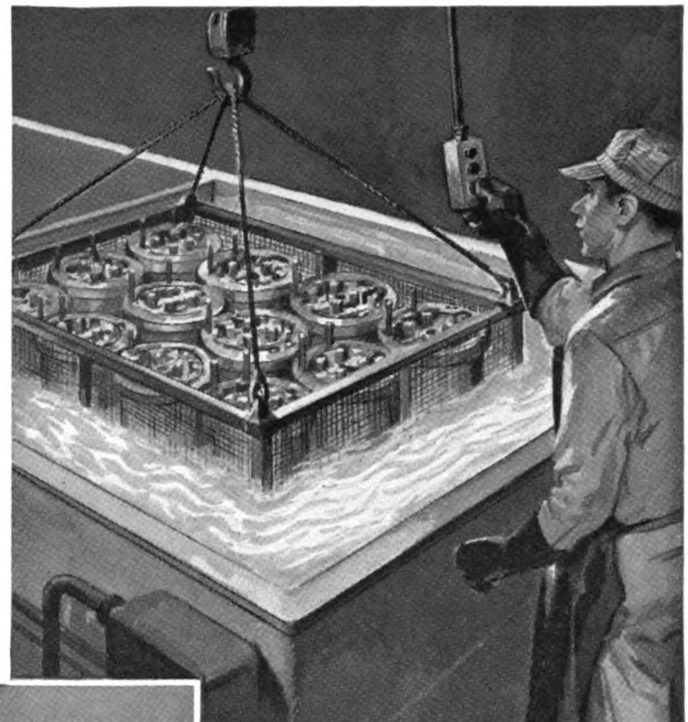

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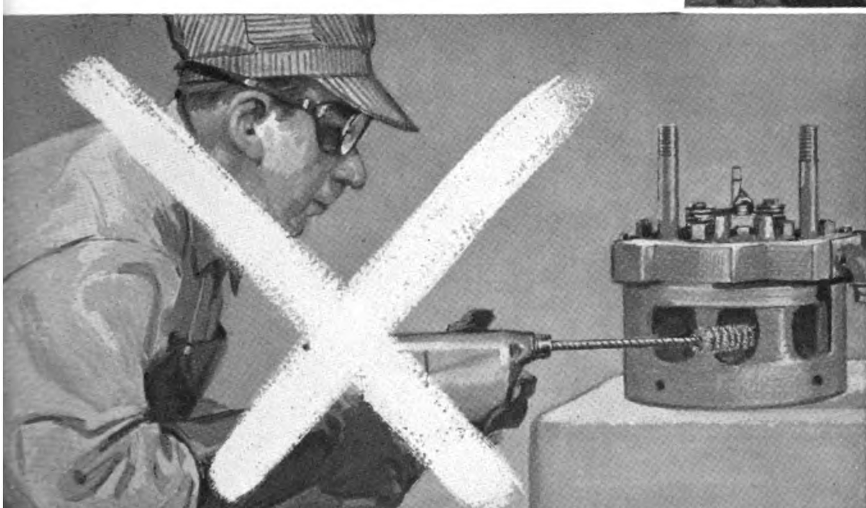

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AAR Proposes 200-Ton Duplex Hopper Car for Bulk Service

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A Simmons-Boardman
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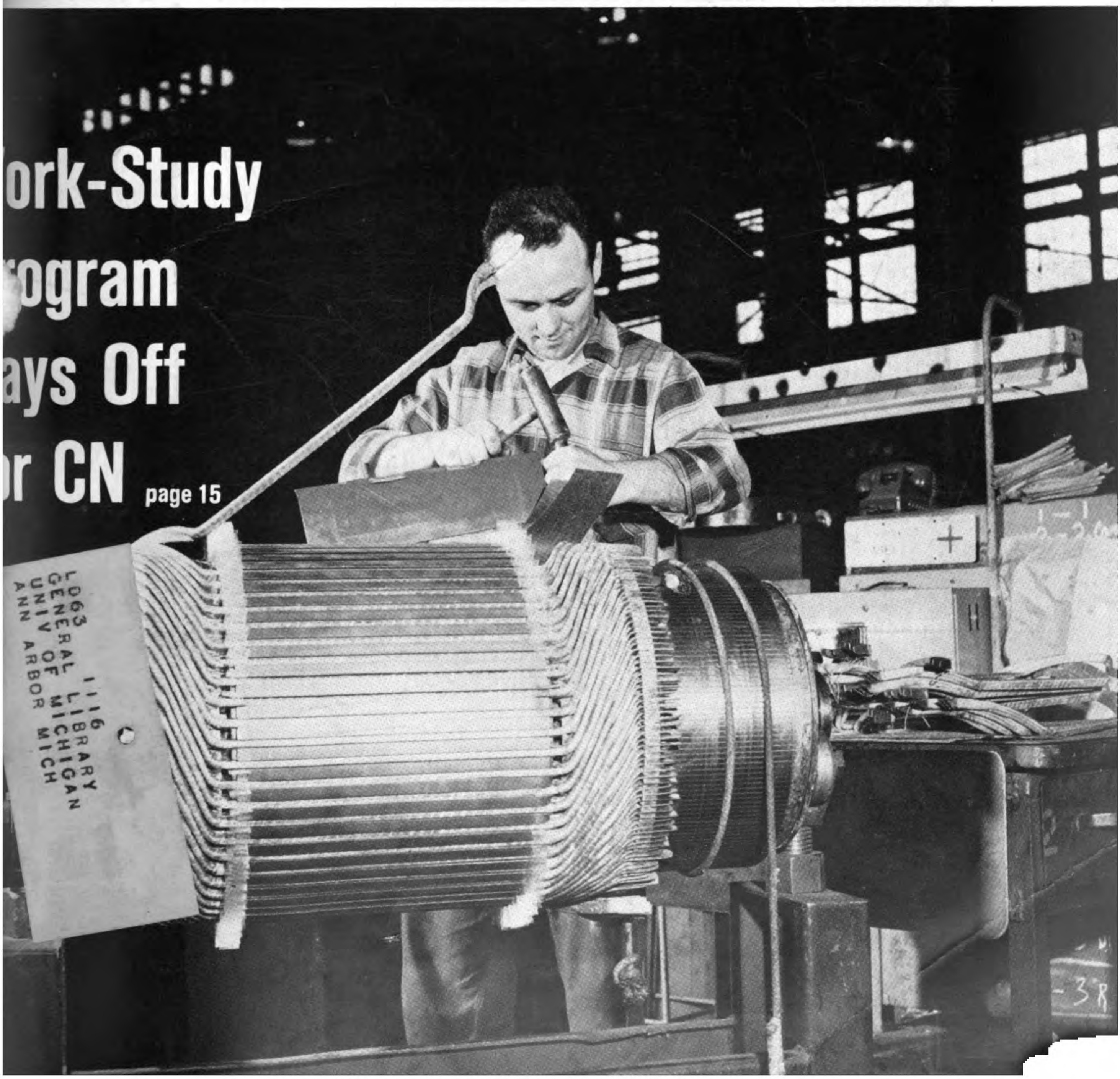

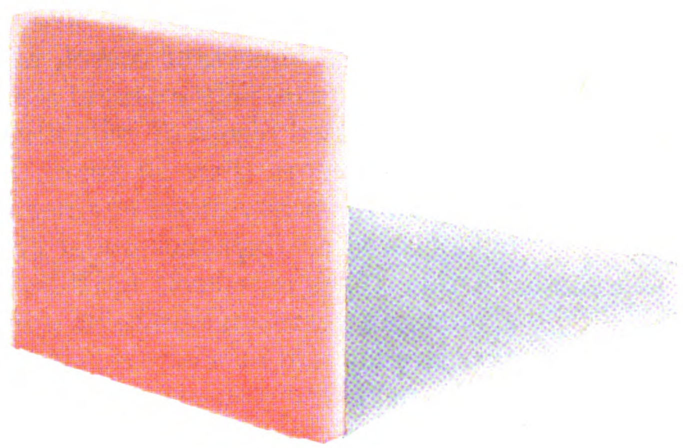

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America's Oldest Trade Paper
February, 1963—Vol. 137, No. 2

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CULATION DEPARTMENT: **R. H. Lash, Director of Circulation, 30 Church st., New York 7.** ntry of second-class privileges authorized at Newark, N. J., with additional second-class leges, Bristol, Conn. Subscription price to railroad employees only in U. S. possessions, ada, and Mexico, $3.00 one year, $4.00 two years, payable in advance and postage free. cription price to other subscribers in above geographic areas $4.00 for one year, $7.00 for years. All other areas $8.00 per year. Single copies, 75¢. Address all subscriptions and espondence concerning them to: Subscription Department, Railway Locomotives and Cars, ett st., Bristol, Conn. Changes of address should reach us three weeks in advance of the issue date. Send old address with the new, enclosing, if possible, your address label. The Office will not forward copies unless you provide extra postage. Duplicate copies cannot ent. **POSTMASTER—SEND FORM 3579 TO EMMETT ST., BRISTOL, CONN.**

Report For February

AAR Seeking Tighter Car Specifications

Expenses resulting from freight cars which incorporate weak body structural components represent not only a financial drain on the car owner, but on the entire railway industry. F. Peronto, executive vice chairman of the AAR Mechanical Division, recently told a railway supply group in Chicago that it has been recognized as necessary for the Mechanical Division to establish minimum requirements for all critical stress areas of freight cars in order to insure "usable" equipment in the industry. He warned that some railroads, private car operators, and builders have been involved in "trimming down" in critical stress areas. In their quest for low-cost cars, "there has been some lack of foresight and firmness," Mr. Peronto said. "When outlets were found for such inferior equipment, the fleet of interchange cars was naturally affected."

The need for minimum requirements for certain operating components of railroad rolling stock was recognized many years ago. Involved in the resulting AAR standards are wheel-and-axle assemblies, air brakes, brake rigging, draft rigging, journal bearings, and truck details. "These actions have brought about a very high standard of efficiency and safety which could never have been accomplished if it had been left to judgment, discretion, and whims of several hundred car owners and suppliers," Mr. Peronto continued. The only body structural details involved in the past have been center sills and, for certain cars, the floors and floor supports.

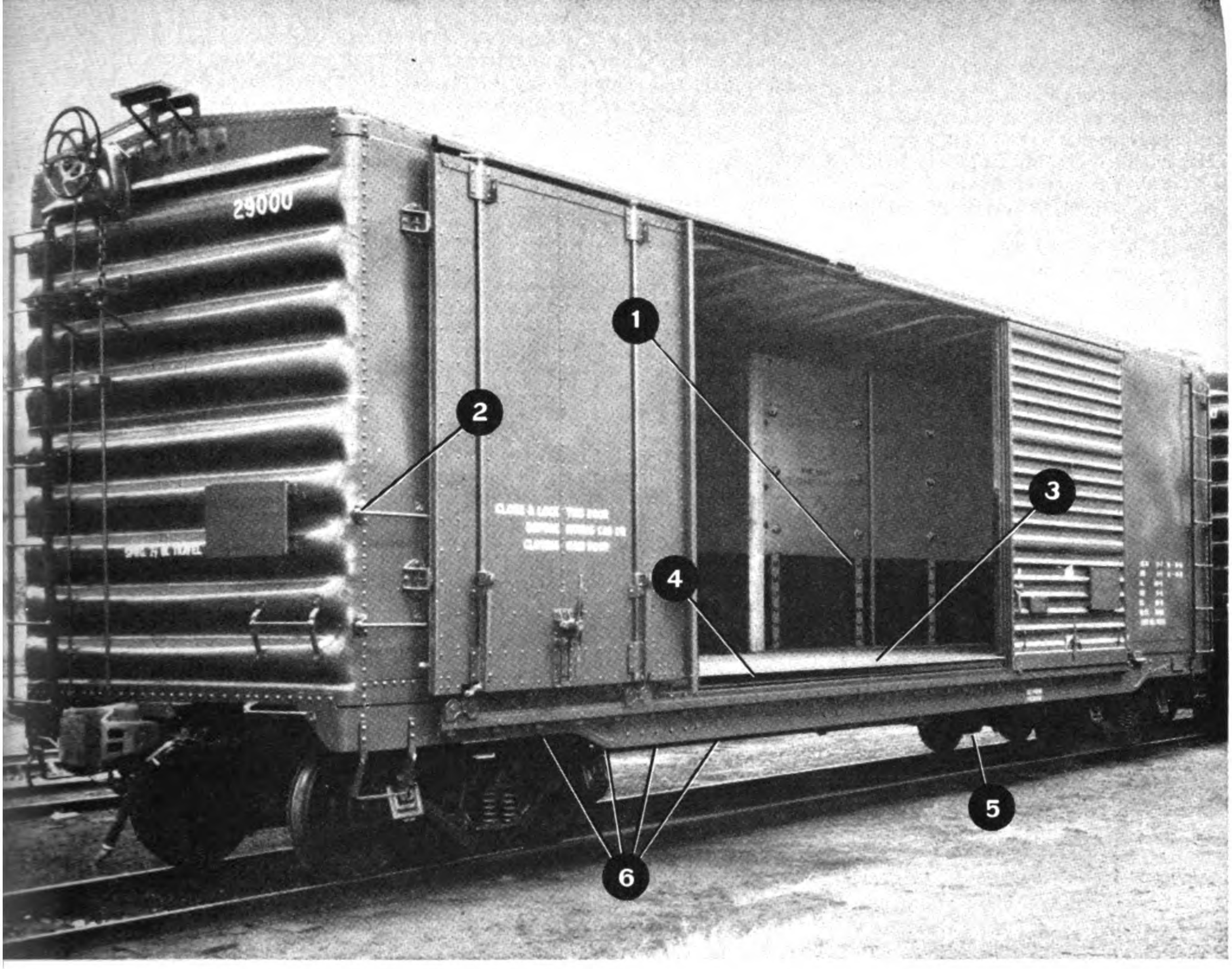
"The need has now been recognized for establishment of minimum requirements for certain critical stress areas in the body structure. Lack of foresight and unified action has cost, and is still costing, the industry millions of dollars each year," Mr. Peronto said. There are "hundreds" of cases monthly when it becomes necessary to transfer lading en route because of failures of structural parts such as body bolsters, side sills, door posts, and their connections at sills, broken floors and supports, and other details. Involved in such equipment failures, cost of which are high, are labor for lading transfer and car repair, lading damage, loss of car availability, and dissatisfied customers.

This situation is one of several considered in connection with the fundamentals of car design now being studied by a special AAR task force. Mr. Peronto said that when any car owner—railroad or private car line—is about to acquire new freight cars, it should not only look to its own particular situation, but beyond this to the requirement of the railroad industry as a whole. "It is now recognized that there should be an approved set of minimum requirements for all critical stress areas," he concluded.

A-C Proposed for Transit Electrification

Commercial-frequency distribution is practical for rapid transit operations, L. G.

(Continued on page 8)



Six ways to keep a freight car handling freight...

To keep cars earning income, you must keep them off the rip tracks. That much is simple. How to do it is not so simple. At MacLean-Fogg we do not pretend to have all the answers. We do know, though, that carriers who equip their cars with M-F products at the six critical spots noted in our picture, are taking six important steps toward lower maintenance costs—higher income.

These six M-F special railroad products are tested and proved . . . some of them for over forty years. We think you'll profit from their use. Try them and see.

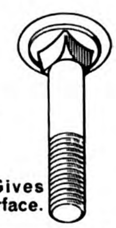
1 M-F LADING STRAP ANCHORS

For faster, more secure, anchoring of lading. Available for all type cars.

2 G-T Washers

For replacing grab irons and ladders from *outside* the car. Safe and economical.

3 M-F WATERTIGHT BOLTS

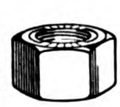


For decking. Gives smooth, flush surface.

4 M-F THRESHOLD PLATES

Standard equipment on over 200,000 cars. Vital for today's wider openings.

5 M-F UNI-TORQUE LOCK NUTS



Can't loosen under severe vibration. Use them on air brake equipment and at all critical locations.

6 M-F LOCK-TIGHT FLOOR CLIPS

To apply floors faster without drilling sill. Millions in use on major roads.

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IN CANADA: THE HOLDEN CO., LIMITED, MONTREAL

Report

(Continued from page 5)

Anderson of the Chicago Transit Authority told the Winter General Meeting of the Institute of Electrical and Electronic Engineers in New York. Mr. Anderson described such a system applied to the CTA's proposed 10-mile Northwest Expressway extension.

Compared with the conventional direct-current system are the following advantages, according to the author:

- Lower first cost;
- Lower transmission losses;
- Smaller annual power requirements;
- Decreased power consumption because of regenerative braking;
- Improved scheduled speeds because of better voltage characteristics.

The system, applicable to trolley systems, was described as applied to a conventional third-rail system with the associated high impedance of its magnetic conductors. "The high reactance of a magnetic third-rail is overcome by using a large number of small transformers that cost little more than the same kva capacity in large transformers," Mr. Anderson said. The problem of unbalanced power loading is not serious and can be corrected by auxiliary equipment of only about 10% the capacity of the system. Sectionalizing with commercial frequency will probably cost the same as that with a direct-current system. Transmission efficiency would be increased considerably due to the high-voltage system. Voltage regulation at the cars would be improved.

The system is divided into approximately three equally loaded parts. Each is connected to the three-phase system as a delta-connected load. These parts are divided into two sections, each of which is protected by a high-voltage circuit breaker at the point of supply. "Any desired number of sections can be obtained by further dividing these parts," it was explained. Cars on the system could use single-phase a-c motors or three-phase induction motors, with the single-phase trolley power converted to three-phase by the addition of negative-sequence current.

Mr. Anderson proposed that cars be fitted with d-c traction motors so they could operate over routes which may be supplied in part by direct current. When on an a-c section, motors would take their pulsating current through silicon-controlled rectifiers which are regulated by a pulse-wave generator designed to hold the rectifier in the cutoff position until the pulse occurs.

AAR Issues New Interchange Rules

The 1963 Interchange Rules for freight and passenger cars and for piggyback trailers have been issued by the AAR Mechanical Division. Most significant of the changes included in the Code of Rules Governing the Condition of, and Repairs To, Freight and Passenger Cars is the authorization of complete punch card reporting and billing (RL&C, Dec. 1962, p 29). These changes required modifications or deletions in Interchange Rules 91, 92, 93, 94, 96 and 100. Rules 92, 93, 96, 98 and 100 have been eliminated completely. Instructions included in these rules, where pertinent, are now part of revised Rule 91, and new Rule 92 provides for the alternate standard method of machine billing using preprinted and prepunched billing repair cards.

Major modifications in the Code of Rules Governing the Interchange of, Repairs To, and Settlement for, Trailers and Containers used in Trailer-on-Flat-Car (TOFC) Service involve Rules 14, 61, 82, 86, 90, 97, 98, 157, and 172. Primarily involved in these changes are the handling of refrigerated trailers and the upping to $150 of the earlier $50 limit for damage because the latter had been found too low, complicating proper handling of repairs.

Both of these booklets may be obt[illegible] from the secretary, AAR Mechanical Di[illegible] sion, 59 E. Van Buren st., Chicago 5. I[illegible] Interchange Rules for freight and passe[illegible] cars cost $1.35 per copy; $57 for 50 co[illegible] $104 for 100 copies or more. The TO[illegible] rules cost 40 cents per copy; 30 cents [illegible] copy for 50 or more; 25 cents per copy [illegible] 100 or more. All prices f.o.b. point of sh[illegible] ment.

Truck Components Require Attention

Lubricators for solid bearing jou[illegible] boxes and liners for center plates should [illegible] installed with care, according to recent [illegible] nouncements made by the AAR Mecha[illegible] cal Division. F. Peronto, executive [illegible] chairman, cautioned that repair points [illegible] sure in applying journal lubricators at pe[illegible] odic lubrication that these lubricators [illegible] be capable of operating for a full 30-mo[illegible] period.

Mr. Peronto cited a member road wh[illegible] stated that, in the journal boxes of [illegible] which had been shopped, the lubrica[illegible] pads were torn and the cores complete[illegible] composed. Wicking threads from the [illegible] covers had rotted, making it necessar[illegible] replace three journal bearings because [illegible] threads had caused lining metal to ru[illegible] addition to his warning about comple[illegible] installations, Mr. Peronto also urged [illegible] the same care be used in applying indi[illegible] lubricators at all times.

The use of various types of center [illegible] liners has been increasing. Mr. Pe[illegible] reported that the chief mechanical offi[illegible] the Southern Pacific recently report[illegible] train derailment caused by the applic[illegible] of four center plate liners which red[illegible] the engagement between the truck and [illegible] center plates. Engagement between [illegible] two had been reduced to ⅝ in., viola[illegible] the 1⅛ in. requirement of Interchange [illegible] 20. "In view of this accident," Mr. Pe[illegible] said, "it is suggested that instructions [illegible] sued by all roads to make sure that wh[illegible] liner or liners are applied they do not [illegible] up too much room in the bowl of the [illegible] center plate so as to reduce the rem[illegible] vertical bearing surface below 1⅛ in. [illegible] not the intention to discourage the a[illegible] tion of center-plate liners.

U.S. Seeks to Have GM Sell Electro-Motive

A civil antitrust suit seeking court [illegible] which would require the General M[illegible] Corp. to divest itself of its Electro-M[illegible] Division has been filed by the Depar[illegible] of Justice. It charges violations o[illegible] Sherman Act forbidding monopolies [illegible] of the Clayton Act which forbids a[illegible] tions which tend to create monopolies [illegible] legations of the complaint are thu[illegible] those of the still-pending criminal [illegible] which was brought against GM in [illegible] 1961 (RL&C, May 1961, p 36).

GM declined comment on the late[illegible] ernment action. A GM spokesman [illegible]

(Continued on page 42)

Orders and Inquiries for New Equipment

Placed Since Closing of January Issue

Locomotive Orders

GREEN BAY & WESTERN. *Alco:* One DL640-A 2,400-hp road switcher.

UNION PACIFIC.—EMD: 75 2,250-hp diesel-electric locomotives for high-speed freight service. Deliveries under way.

Freight-Car Orders

ATLANTIC COAST LINE.—*Pullman Standard:* 300 70-ton, 50½-ft cushion underframe box cars equipped with lading protection devices and roller bearings. Deliveries to begin in March and continue at rate of 75 cars per week.

MISSOURI PACIFIC.—*ACF:* 900 70-ton, 50½-ft cars box with 16-ft sliding doors, cushion underframes and roller bearings. 100 to be equipped to handle auto parts. *Bethlehem Steel:* 400 100-ton hopper cars. *General American:* 150 insulated box cars. *Pacific Car & Fdry:* 100 mechanical refrigerator c-ars. *General Steel Industries:* 100 flat cars. Cost of these 1,650 cars approximately $24,000,000. Road's capital spending for 1963 increased to $36,000,000 from original $28,274,000 which included only $16,579,000 for the purchase of 1,100 cars (RL&C, Jan. 1963, p 8).

NORFOLK & WESTERN.—*Ortner:* 40 70-ton, wood-chip hopper cars. Cost, over $600,000. For early spring delivery.

ROCK ISLAND.—*Pullman-Standard:* 10 70-ton, 50½-ft box cars equipped with Hydroframe-60 cushion underframes. Cost, $145,000. For delivery third quarter 1963.

UNION TANK CAR.—*Company shops:* 99 tank cars. Built during December.

SOUTHERN.—*Thrall Car:* 40 bulkhead, tie-down chain-equipped 100-ton flat cars for lumber service. To be equipped with roller bearings. For delivery April 1.

Notes and Inquiries

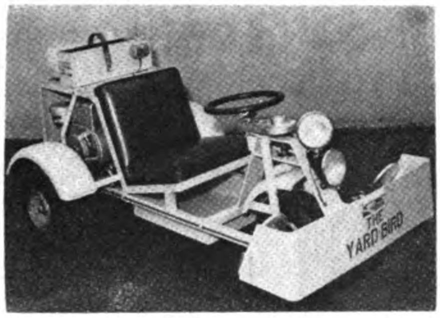
The *Gulf, Mobile & Ohio* has budgeted $10 million for new locomotives, additional freight cars, and other plant improvements during 1963.

The *Louisville & Nashville* has announced a $28,000,000 equipment purchase program for 1963 —$20,000,000 for 20 new diesel locomotives and approximately 1,000 specialized freight cars of various types, and $8,000,000 for rebuilding, enlarging and modifying another 1,150 cars to handle greater bulk or heavier loads. Program also includes rebuilding 100 cabooses. The locomotives will be general purpose 2,250-hp units which can be used independently or in multiple combinations. They will replace a similar number of 1,500-hp units. All cars will have roller bearings and many will have cushion underframes and interior protective devices.

The *New Haven* will obtain 50 air-conditioned, multiple-unit electric commuter cars under a leasing arrangement from the Port of New York Authority under New York State Commuter Aid Program. Delivery to be made in early 1964.

The *New York Central* will obtain 34 air-conditioned, multiple-unit electric commuter cars under a leasing arrangement from the Port of New York Authority under New York State Commuter Aid Program. This is the same program which enabled the NYC to place 53 cars of the same type in service during 1962.

What's New in Equipment



Inspection Vehicle

The "Yard Bird" is a low, single-seat, three-wheel vehicle fitted with special equipment to facilitate car inspection work. It is driven by a 6-hp, 4-cycle gasoline engine with oil bath air filter and rewind starter. Its 6-in. aluminum wheels are equipped with pneumatic tires and the unit can turn in a radius of 65 in. Eye level of the operator is about 42 in. above the ground, permitting close inspection of underframe components. On its fuel capacity of 2 gal, the vehicle can operate for about 10 hr at speeds up to 10 mph. An adjustable spot light facilitates night inspection. Reed Engineering, Inc.

For more information, circle 2-1 on card following page 46.

Hot Tank Cleaning

Turco Super Ferrex, a hot-tank cleaner, is said to remove crater compounds, multiple coatings of paint, grease, oil, and other stubborn soils at half the concentration required by other hot-tank cleaners. It is soluble and remains in solution, rinsing easily and freely. Turco Products, Inc.

For more information, circle 2-2 on card following page 46.

Valve Testing Device

Eddy current sensing, mechanical rotation, and an automatic alarm system incorporated in the Magnatest ET-188 testing device are said to quickly detect thermal and grinding cracks in diesel-valve faces. With little training, up to 350 valves per hour can be processed. Cracks previously difficult to detect, either visually or with penetrant tests, are signalled by a flashing red light. The device operates over a range of 134 to 54 kilocycles, and can be set up at any location where 115-volt, 60-cycle alternating current is available. Magnaflux Corp.

For more information, circle 2-3 on card following page 46.

Car End Straightener

The Rotoboom, a device used on the Southern Pacific, for straightening the ends of gondolas and box cars, consists of a detachable tractor-mounted hydraulic boom with special hydraulic tool head. It is driven alongside two coupled cars, one or both of which require straightening, and the boom head is swung between them. After power head is properly located, working force is applied to car being straightened. If adjacent car also requires straightening, the tool head is then rotated 180 deg and process is repeated. Pressure of 200 psi is produced by three hydraulic cylinders, providing a total capacity of 50 tons. The straightener has a 13-ft reach and will rotate 360 deg around the tractor. At the end of the boom, the tool head can be rotated 210 deg. The tool head, essentially a triple hydraulic jack, is also used to raise cars for wheel-truck spring changes. Tractor is equipped with front-end loader for handling sand, gravel, and other yard materials. Deere & Co.

For more information, circle 2-4 on card following page 46.

Power Drive System

The Tracpak system fits into the standard inside bearing trucks of any rapid transit vehicle with a 6-ft 6-in., or larger, wheel base and a wheel diameter of at least 28 in. The system, by which cars can be electrically accelerated and dynamically braked, consists of a high-speed d-c traction motor currently available in ratings to 150 hp combined with parallel double-reduction gearing in one fully resilient mounted unit. The motor side of the system is supported from the truck frame by a resilient vertical hanger which absorbs weight and torque reaction forces but permits freedom of axle motion. The axle side of the drive system is supported by a large double-disc resilient coupling mounted in the truck axle. This

coupling acts as a two-point support to ab-sorb any twisting motion in the power u A horizontal stabilizer suppresses axle duced vibrations and lateral shock forces the motor. Westinghouse Electric Corp

For more information, circle 2-5 on c following page 46.

Cleaning Tool

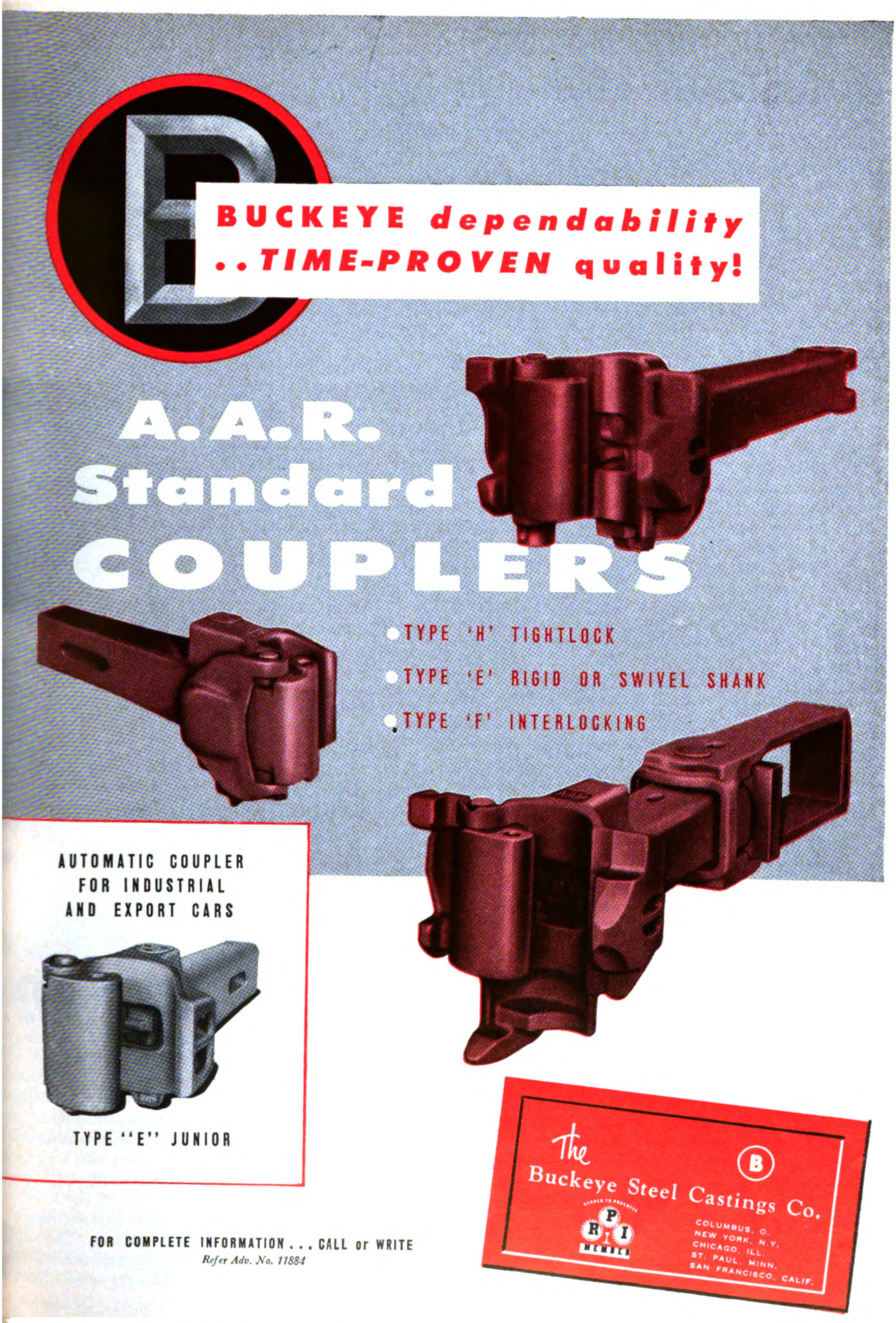
The Rem-Gun, a high-capacity press cleaning gun, using steam or compres air, operates at pressures ranging from 5 200 psi. It is shown cleaning a diesel lo motive, using about 110-psi steam from enginehouse steamheat line to remove ca grease, oil and dirt from side frames, springs, and similar parts subject to cl mechanical inspection. It has three in changeable nozzle bushings of different and weighs 7½ lb. Railway Equipment Methods Co.

For more information, circle 2-6 on c following page 46.

Impact Wrench

The six-vane motor and a new energy c version unit of the CP-40 Compact air i pact wrench provides hard hitting imp action with low air consumption. T

(Continued on page 42)


BUCKEYE dependability
..TIME-PROVEN quality!
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Standard
COUPLERS
TYPE 'H' TIGHTLOCK
TYPE 'E' RIGID OR SWIVEL SHANK
TYPE 'F' INTERLOCKING
AUTOMATIC COUPLER
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Editorials

Look Ahead, Look Around

The Southern "has only scratched the surface in the development of customer-oriented cars," D. W. Brosnan, president, told the Railroad Management Institute at American University recently. "This is a tremendously important and far-too-long-neglected step along the path to new traffic and higher profits. All railroads must do more of this. Freight cars designed and built for the traffic of the Model T Ford era are passe in today's highly competitive transportation market." Concluded Mr. Brosnan, "Freight cars of this vintage should be junked."

With the increasing use of the highly specialized freight cars which result from progressive policies such as those of the Southern, there may frequently be a tendency to forget the general service cars which, at the moment, do make up the bulk of the American car fleet. While tank cars for hauling super-cold liquid hydrogen, high-capacity covered hoppers handling grain in bulk, and rack cars which can handle up to fifteen automobiles have captured the attention of railroaders, shippers and the public, it must be remembered that much more prosaic equipment is still responsible for most railroad freight revenues. While this may not, and probably should not, continue for too much longer, the general service cars and their details still are deserving of some attention. While looking ahead, railroads should also be looking around.

Recently, the AAR Mechanical Division issued two circulars pertaining to box cars—standard box cars. One deals with Paragraph d-1 of Interchange Rule 3 calling for application of top-door safety hangers on all box cars in interchange by January 1, 1966. This has applied to all new and rebuilt cars since January 1, 1961. However, such a requirement makes it necessary to take another look at the box cars which have not been rebuilt and, in light of their condition and of changing traffic patterns, are not likely to be. Mechanical officers should, by now, have determined just which cars have this design deficiency and should be ascertaining what the future of such cars is to be. If they are to be retired, the 1966 date would be one to consider in scheduling equipment retirements. If they are to continue in service, plans should be underway to comply with the interchange rule.

Floor stringers in box cars, subject of another AAR letter, have been of interest to various Mechanical Division groups for some time because of their role in floor strength. Several years ago it became mandatory to use three 3-in. 6.7-lb Z-section stringers on each side of the center sill. Work recently done at the AAR Research Center has shown that three 3-in. 5.7-lb I-beam stringers would result "in a 15% reduction in weight of floor stringers with an increase of 25% in the strength of the floor." This is followed by the statement that the Committee on Freight and Passenger Car Construction regards the 5.7-lb I-beam to be a proper substitute for the 6.7 lb Z-bar. Traditionally Zees and angles have been the most widely used car-building structural sections. Their wide flanges have much to commend them in riveted cars. However, with the increasing popularity of welding and th use of riveting, it might well be time to analyze ponents of AAR standard cars to determine if efficient structurals are being used. This undou be one of the assignments of the recently establis Task Force on freight-car design.

Hiding Locomotives

The railroads started buying new diesel power in cant quantities last year and the trend has contin 1963. Along with this upward surge in buying th also been stepped-up activity in new locomotive A great deal of secrecy surrounds the latter aspect motive power situation.

The big orders have been for current models of the major builders and these purchases are a matter of re Not on the record officially, however, are some activiti the locomotive field that appear to be known by many siders although not acknowledged by the parties invol either in production or in purchase.

European sources reported an order for 15 Krauss-Maffei diesel-hydraulics by the Southern Pac A newspaper reported that Alco will build three di hydraulic locomotives for the same railroad. It was a magazine that said the Union Pacific was more tha terested in a 5,000-hp locomotive to be built by Gen Electric.

These are only examples of not so well-kept sec Such "secrets" usually are founded on facts. Which goes to prove how difficult it is to hide a locomotive u a bushel basket.

The Century Line

It is no secret however, that Alco has a new line of die electric power. On January 29 the Century series was nounced by the builder at Chicago.

Initially, the series includes three locomotives but A expects to add more as required. The three new units the Century 420, a four-motor 2,000-hp model, the and the 624, four- and six-motor 2,400-hp locomoti respectively. Previous models of the builder were of same axle, motor and horsepower design but the new has been developed with a number of key improveme

These features include a new pressurized air system cool electrical rotating equipment and a pressurized gine compartment to exclude dirt. They also have a se transistorized control compartment, a self-cleaning ra tor placed horizontally over the rear of the locomot and body design to give better access to components.

We welcome the new locomotive line. The railro need up-to-date power to speed customer-oriented fre cars to their destination and produce the service that ke traffic on the rails.

EVITE: New source for EMD bearing replacements

ut new. Cleveland Graphite ze, world's largest maker of engine bearings, now offers tented heavy-duty bearing for cements of EMD main and earings.

type bearing is *old*, produced any years at the rate of four n a month. Yet, it's *new*, the time this bearing has been ble for use in EMD engines.

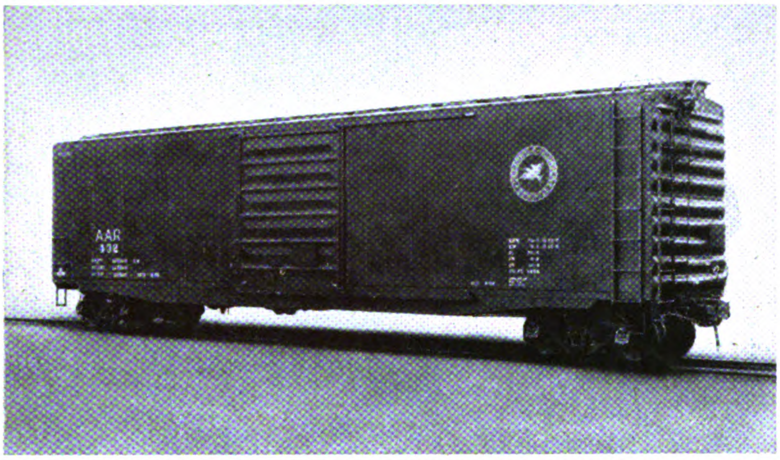
ickel barrier stops tin migra- rom the overlay. It increases ng life by enabling overlay to withstand corrosion at all times. The abrasion resistance and surface action of the overlay maintain new bearing quality at all times.

Copper-Lead-Tin overlay: Fatigue life of the overlay is increased substantially by the addition of 3% copper in the precision electroplated overlay.

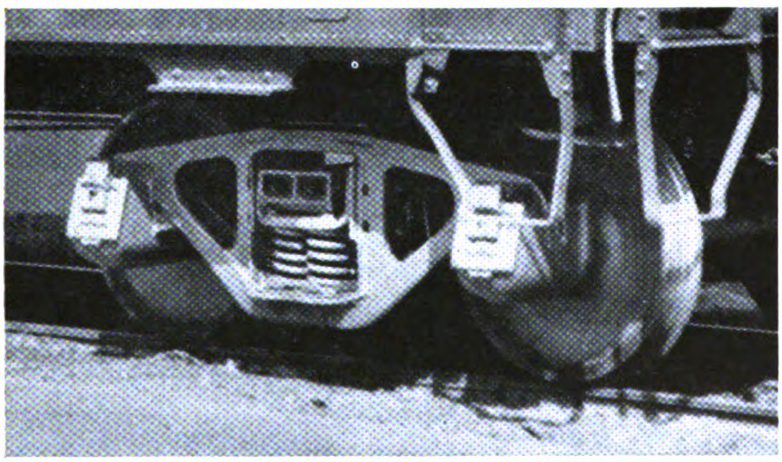
PRI MEMBER

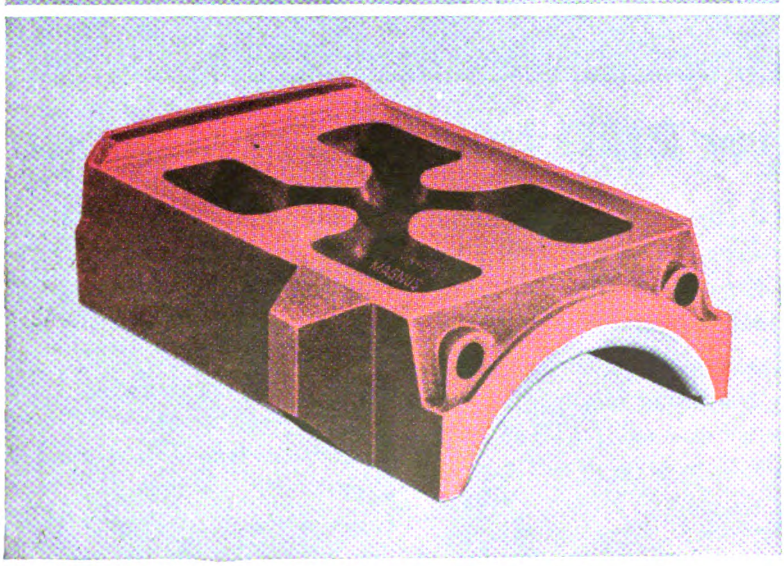
CLEVITE

Improved – yet the cost is less! Only Cleveland Graphite Bronze can offer this improved four layer bearing. Take full advantage of this product that combines product improvement with cost reduction. For complete information, contact *Cleveland Graphite Bronze, division of Clevite Corporation, 17000 St. Clair Avenue, Cleveland 10, Ohio. In Canada: Clevite Ltd., 1177 Talbot, St. Thomas, Ontario.* Also manufacturers and distributors of the Clevite Journal Bearing Cartridge.



AAR





ı rewind assembly line (foreground) is followed by traction-motor assembly area (rear). Design of shop aims at producing smooth material flow.

ꞁearranged CN Shop Returns 37%

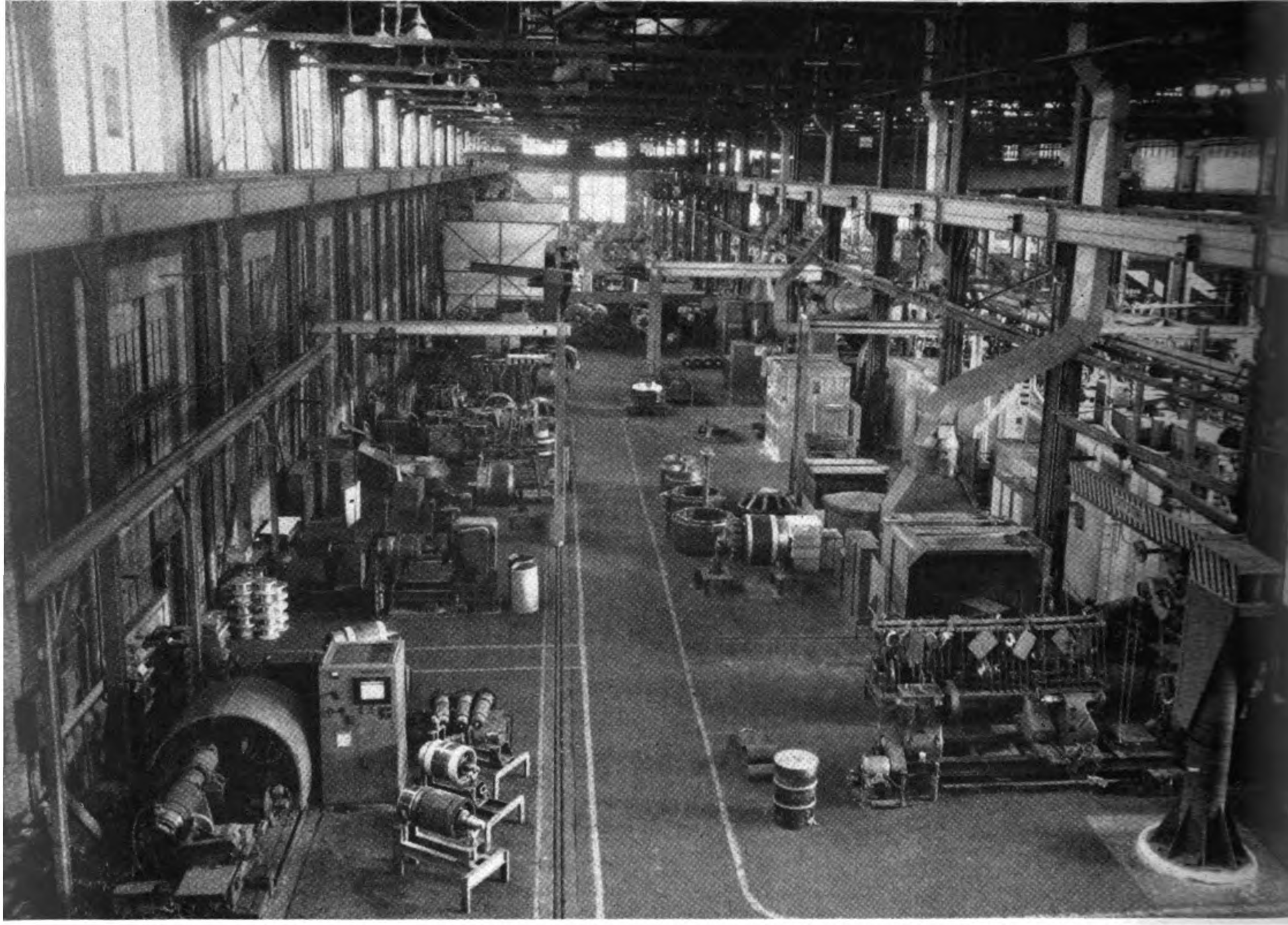
Electrical shop layout was altered and materials handling methods were changed to produce savings

ꞁearrangement of the equipment machines and the addition of new ːerials handling equipment and ts containers have made possible a stantial increase in productivity at Canadian National's electrical shop Montreal. Return on the $80,000 ːstment involved in these changes proved to be $30,000 annually—ːte of 37.5%.

The facility, known as the electrical ding shop, repairs and rebuilds ːtrical rotating apparatus for cars, ɔmotives, and various types of intrial equipment, along with nonıting equipment such as transformers, magnets, etc., for shop or line use. Such an operation for North America's largest railway system presents major production problems. In CN's rolling-stock ownership are 2,127 diesel-electric locomotive units and approximately 3,000 passenger cars. While part of these are assigned to other major CN shops at Moncton, N.B., and Winnipeg, Man., for overhaul, the greatest number are repaired at Point St. Charles shop in Montreal. In addition, traction-motor and main generator armature rewinds, and heavy repairs to main generator frames for locomotives undergoing repair at Moncton and Winnipeg are brought to Point St. Charles winding shop.

Canadian National diesel locomotives have been built by four different builders and are of widely diversified models. As a result, their electrical transmission equipment and auxiliaries are the products of several manufacturers and are of a variety of types. For example, the study showed overhaul at Point St. Charles involved several types under each of the major locomotive component classifications:

- Main generators .... 10 types
- Traction motors .... 8 types
- Electrical auxiliaries . 24 types



Main generator bay is adjacent and parallel to traction motor repair bay (facing page). Original shop arrangement required considerable trans- fer of components between these two areas. Rearrangement of aimed to minimize this and transfer parts which could be moved e

Car lighting equipment involves still other types of armatures, frames and field coils. In rearranging the shop, however, all efforts were devoted to the processing of traction generators, traction motors, and locomotive auxiliaries such as exciters traction-motor-blower motors, and fuel-pump motors. Remodeling of the winding shop resulted from a study undertaken in 1958. Defining the problem finally led to these objectives for the winding shop:

- A layout which would give minimum lines of flow for all materials while reducing or eliminating all back-tracking and cross-tracking if possible;
- Materials handling equipment which would give most efficient handling at lowest cost;
- Selection or design of pallets, skids and other containers to be used in conjunction with the materials-handling equipment.

To achieve the minimized flow line for all materials, a completely new equipment layout was necessary. The electrical winding shop is located in two adjacent bays of the motive power shop at Point St. Charles. In one bay were the following: dismantling area for traction motors and auxiliaries, degreaser, corn blast, bearing room, commutator lathe, induction soldering machine, all ovens and insulating varnish tanks, balancing and seasoning machine, and car lighting generator repair area. In the adjacent bay were the main generator repair and storage area, boring-bar machine, armature rewind area, tool crib, traction motor assembly and storage area, and auxiliary repair area.

Parallel Bays

A problem frequently encountered when there are sequential operations in parallel shop bays is that of transferring materials back and forth. This was one of the problems at the CN shop. Each of the bays has its own overhead traveling crane. However, the installation of processing equipment meant that parts had to be transferred back and forth between the bays during the course of overhaul. For example, main generators were disassembled in Bay 2. Because the degreaser was in Bay 1, it was necessary to move the parts with the overh crane in Bay 2 to a track dolly wl was then pushed by a shop truck to degreaser in the adjacent bay. greasing could not be done with pedestal crane normally used for t tion-motor components because of weight of the main generator parts overhead crane in that bay is requi Following cleaning and other ne sary operations, the main gener components had to be returned to assembly area back in Bay 2 by d and overhead crane to assembly a All minor parts of the generator v moved by hand to the degreaser then stored on the floor nearby u picked up by the assembly crew returned to the main generator when the machine was being reas bled.

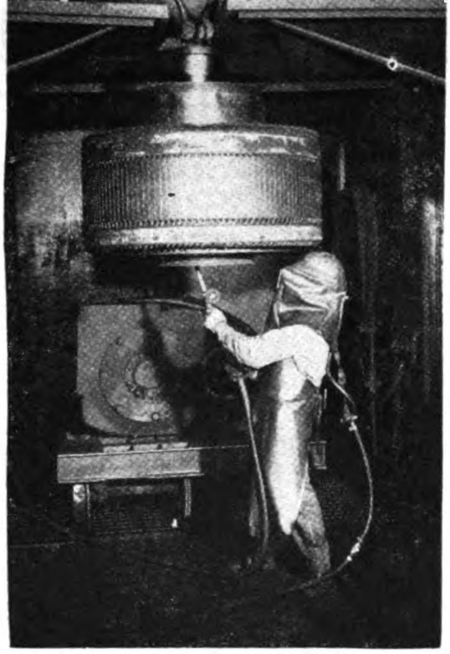
It was found by studying such erations that, while the actual ba bay transfer with the dolly b pushed by a shop truck required 25 sec, the actual delay in such a m averaged over 27 min. Every m with the truck involved a delay min, and every crane movemen volved an average 8-min delay. T

action motor rewind assembly area (foreground) is located adjacent armature stripping section (rear). High frequency soldering machine (left foreground) is used both for traction-motor and main-generator armatures. Ovens are located between bays.

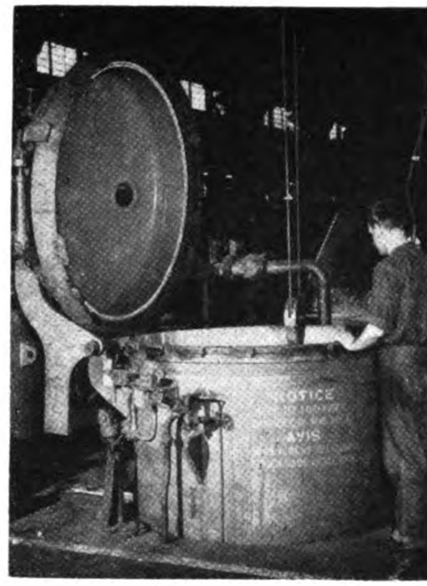
he bay-to-bay transfer involved an verage of two 8-min crane-wait delays and one 9-min truck-wait delay. The truck-wait delay resulted from the act that the truck was away from the lectrical shop 34.1% of the time—ransporting materials to and from the ar shop, brass shop and stores department.

Crane delays resulted in Bay 1 because the overhead crane was used for handling parts at the degreaser almost % of the time and was used for moving parts at the corn-blast and ovens or 32% of the time. Average wait in hat bay was found to be 5 min. In the djacent bay, which also contains the ocomotive truck assembly area, the rane was frequently involved in wheel handling which resulted in an verage winding shop delay per crane movement of 10 min. The analysis f production bottlenecks continued. First step was a thorough analysis of xisting production and handling pro-

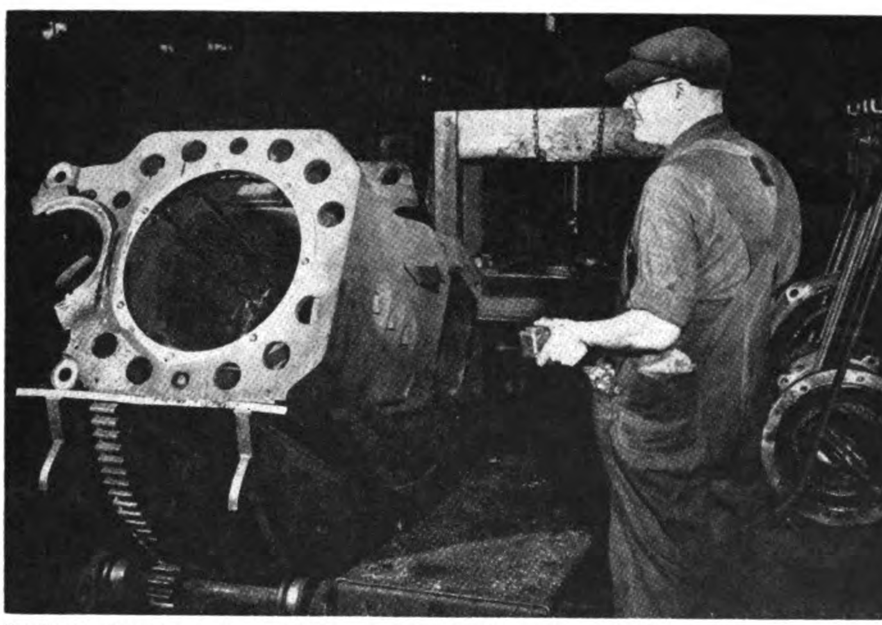
raction-motor assembly area is equipped with acks and stands which make possible orderly arts storage and simplify the working of machines which are undergoing rebuilding.



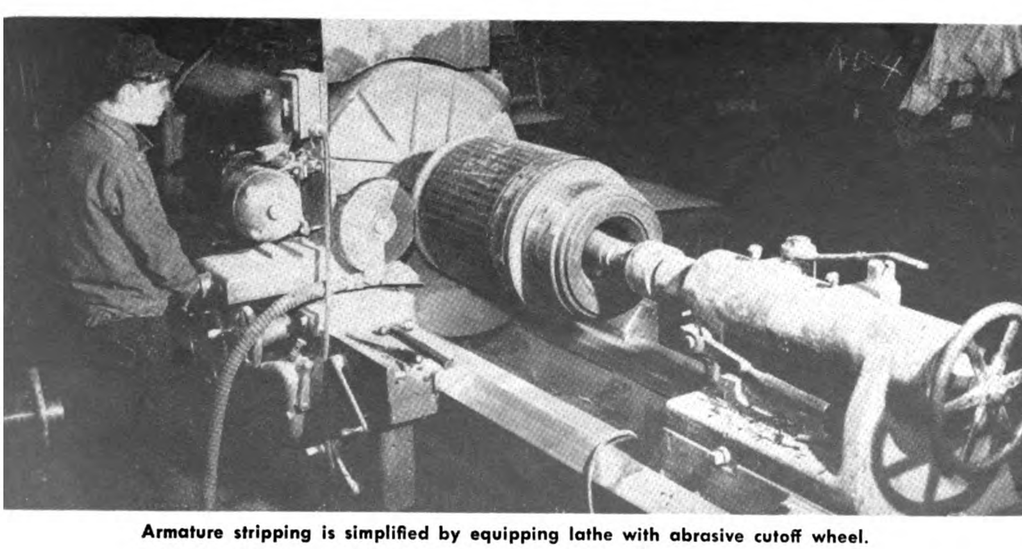
Cornblasting of main generator armature can be done with unit held by overhead crane.



Varnishing and impregnating tanks have been located in main-generator repair bay.



Traction motors are easily upended on turnover stands specially built in the shop.



Armature stripping is simplified by equipping lathe with abrasive cutoff wheel.

cedures which utilized industri gineering techniques to answer se major questions:

What to move. This was ans by studying the production wit total number of man-hours, frequ of overhaul, parts lists, and item c acteristics lists (weights and sizes volved.

Where to move. After the i characteristic lists were prepared were studied to determine which of equipment was most represent of each major group. One typ generator, one type of traction m and six different auxiliary compon were chosen as representative flow-process analyses. The f process charts showed dista moved; times required for operat movements, and delays; equipme move the materials; load capaci materials-handling equipment. characteristics of the various lo From this information assembly p ess charts were prepared.

Process Studies

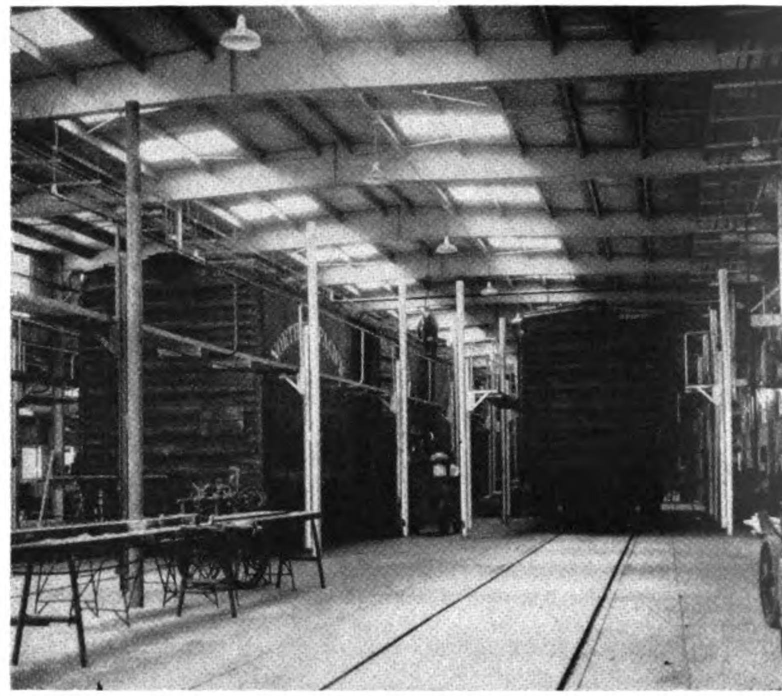
Assembly process charts were pared for basic and major overhau each type of equipment. Flow grams were then drawn showing e representative type of equip chosen for study. These flow patt served to attract attention to un nomical material flow conditions dicated by the density of lines betw machines and bays. They also se as the basis for analysis and comp son of existing and proposed arra ments. Shop layouts and templ also were utilized at this stage.

How to move. Operations analy and time studies were involved in phase of the work. Formulas w developed for each individual m by each piece of materials handl equipment. Such formulas involv variable, the time taken for the act move, and a constant, the time quired for loading, unloading other maneuvering for each operati In addition to the actual transp times, there were the delays to prod tion resulting from waits for materi handling equipment. Also invol were the characteristics and cost st ies of existing and proposed materi handling equipment.

Examination of all these figures to the conclusion that over 14,0 man-hours per year, represent 15.7% of the total operating m

(Continued on page 30)

lorthern Pacific ›ox Car Repairs \re Programmed t Laurel Shop



Adjustable scaffolding on all tracks in wood shop simplifies repair. Car at left is in final stage of program repair which is carried on steadily over 15-station repair line.

?rogram rebuilding of Northern :ific box cars after they have had ›roximately 20 years of service is regular assignment of the NP's ırel, Mont., car shop. The program rently produces three completely onditioned cars daily with a 60-man ce. There are approximately 8,000 κ cars in the classes involved in se rebuilding programs. The NP ight car fleet totals over 34,000 its.

In the course of rebuilding, car side uctures are strengthened, improved e features are incorporated in the cks, interiors are rebuilt, and the :s are completely painted. The re-ilding operation is permanently as-ned to one of the three repair tracks the Laurel shop. The other two are igned for all NP system defect-card ›rk and for miscellaneous car pro-ıms. The shop force of almost 300 :ludes those on the box-car program. Laurel, 16 miles west of Billings, ont., is just east of the mid-point on ꞓ NP's St. Paul-Seattle main line. ıe shop is one of three heavy freight-r facilities on the 6,500-mile system. :hers are at Brainerd, Minn., 139 iles northwest of St. Paul, and at ıcoma, Wash. Brainerd normally sembles most of the new cars which e NP builds in its own shops. Laurel ıs just recently assembled 25 new)-ft, 70-ton flat cars equipped with st-steel underframes, slack adjusters, ıd 6 x 11 roller-bearing trucks. Com-›nents, such as handholds, sill steps, truck dead lever guides, and pipe clamps, are being fabricated at the Brainerd shop.

Along with the three-track car shop at Laurel are the supporting facilities, including a wheel and axle shop, a welding shop, a blacksmith shop, and air-brake shop, and a lubricator-pad-reclamation facility. Wheel sets and AB brake equipment are furnished for local use, also for light car-repair facilities at Livingston, Glendive, and Missoula, Mont. Air-brake components, including brake cylinder and pistons, are reconditioned for the new car programs at Brainerd.

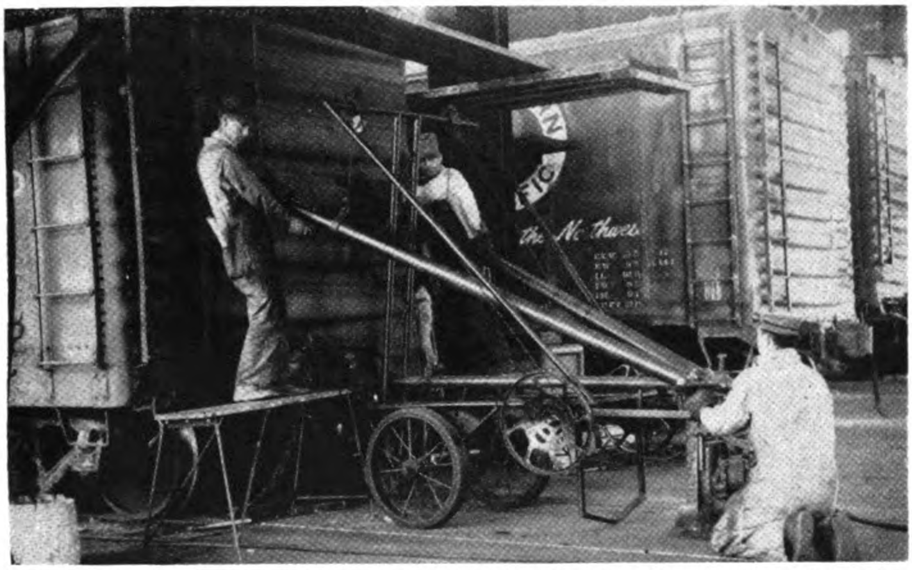
Woodworking Shop

The 250- x 66-ft prefabricated building housing the woodworking shop went into operation in July 1961, replacing the former shop, adjacent to the steel shop, which was destroyed by fire. A 35-ft extension on the south side houses the wood-mill section which produces all the decking and side and end lining. A new 24- x 66-ft paint shop, east of the wood shop, serves all tracks leading from the shop.

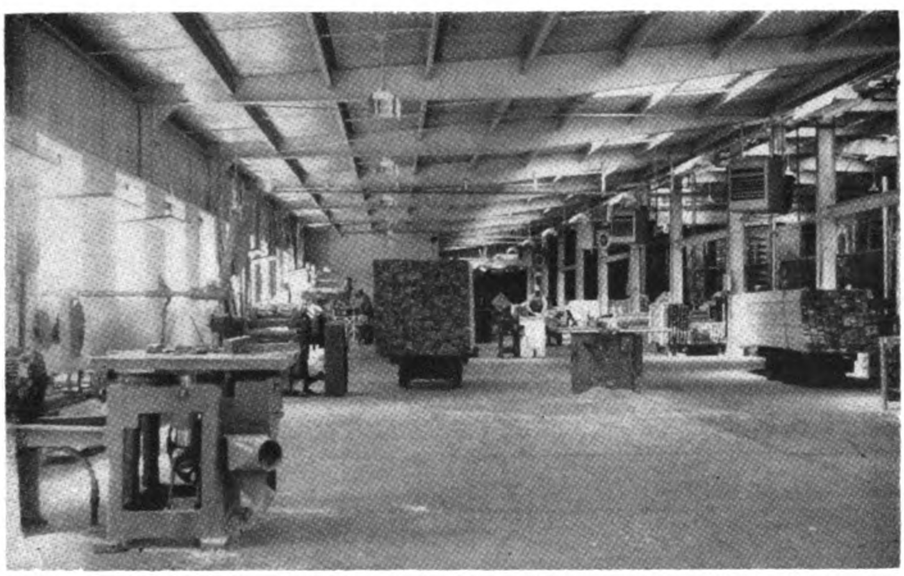
The new buildings have Inland siding. Sides and roofs are insulated with glass-wool mats covered with aluminum foil. Interior walls are lined to a height of 8 ft with plywood. Plastic panel skylights, 8 ft wide, are spaced at regular intervals in the roofs of the main shop and mill section. Under the roof line, on both sides of the woodworking shop, are 6- x 8-ft plastic panels, spaced 10 ft apart. Service lines, color-coded, deliver oxygen, natural gas, compressed air, and water at repair sites.

Tracks 3, 4 and 5, each over 500 ft long, extend through the continuous structure formed by the old and new shop buildings. Defect card work is done on Tracks 3 and 5 on one shift. Use of Track 3 is flexible, permitting program repairs on flat cars and gondolas to be done, depending on the amount of defect-card work available. Damaged cars are repaired on Track 3. Heavy repairs—those requiring over 100 man-hours—are done on Track 5. The working force on Tracks 3 and 5 varies with work load. Tracks in the steel shop hold four cars each; those in the wood shop, five each. Car pullers are available at both ends of the shop for all tracks and at the paint building and stenciling stations. A nine-station operation within the shop forms part of the progressive line for box cars. The line is set up on Track 4 and includes six outside stations.

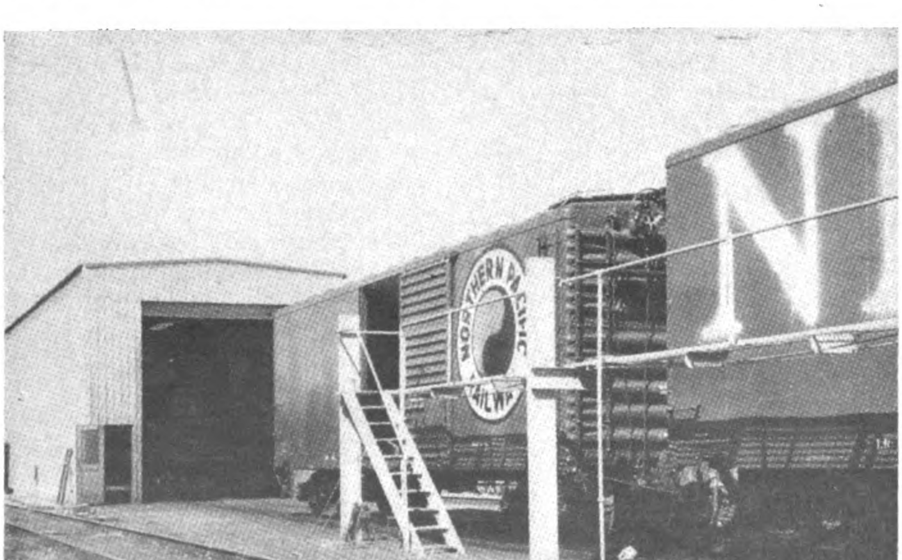
In program repairs on Track 4, the NP is removing the short bulb-angle sub-side sill, applying a full-length channel section to sub-side sill and completing reconditioning the 20-yr-old box cars. This modernization program also involves equipping trucks with 2½-in.-travel springs and ride-stabilizing parts to provide better riding qualities. Rebuilding is done on a 15-station line, with moves being



Bulged ends of cars are straightened on Track 5. Longitudinal member of device is fastened to coupler pin. Pressure developed by air-operated jack is applied by cantilever action.



Mill section of woodworking shop is equipped with all tools necessary for producing the flooring, lining, and other parts needed for cars undergoing repair at the shop.



Scaffolding on three tracks is used for stencilling and other finishing of cars which have been through the paint shop (left). Cars are then weighed as last stage of cycle.

made at 2-hr 20-min. intervals. T stations and the work done at each as follows:

Station 1. Flooring, doors and si lining are removed. Safety applian checked.

Station 2. Cars are sandblasted i side and out.

Station 3. Wood side posts are c off. Rivets are removed at side si and body bolster center plate.

Station 4. Truck repairs. Tru bolsters and side frames are repai in the welding shop. Ride control d vices and journal-box stops applied bolsters. Wheels and spring sets a plied.

Station 5. (First station in the st shop.) All safety appliances rechecl and repaired, if needed. The short si sill is removed and replaced with t channel section extending about 4 beyond the body bolster on each en and tack welded in position. Do are replaced.

Station 6. All holes are reame Ends are straightened with an air jac Roof sheets are replaced here, wh necessary.

Station 7. Riveting position.

Station 8. Steel shedding slo and threshold plates are applied.

Station 9. (First station in t wood shop.) Lubricator pads are a plied to trucks and 2¼-in. fir floori is installed.

Station 10. Air-brake equipment tested and running boards are checke 13/16-in. fir side lining is applied as lining for the car's interior.

Station 11. Any damaged runni boards are replaced. Fir end linin usually 1½-in. thick, is applied.

Station 12. Doors are checked f proper closing and locking. Floors a sanded.

Station 13. Floors are swept. Cei ing is sprayed with insulating materi

Station 14. Paint shop. One fi coat of direct-to-metal paint is appli to the car. A light coat of same is a plied underneath car.

Station 15. Stenciling position

The car is then moved to tra scales, weighed and stenciling co pleted.

In addition to the three heavy r pair lines at Laurel, there are five ru ning repair tracks and two wash trac adjacent to the main shop buildin Each running track has a capacity 20 cars where bad-order loads a empties in transit are worked. On t wash tracks about 35 cars per day a prepared for service.

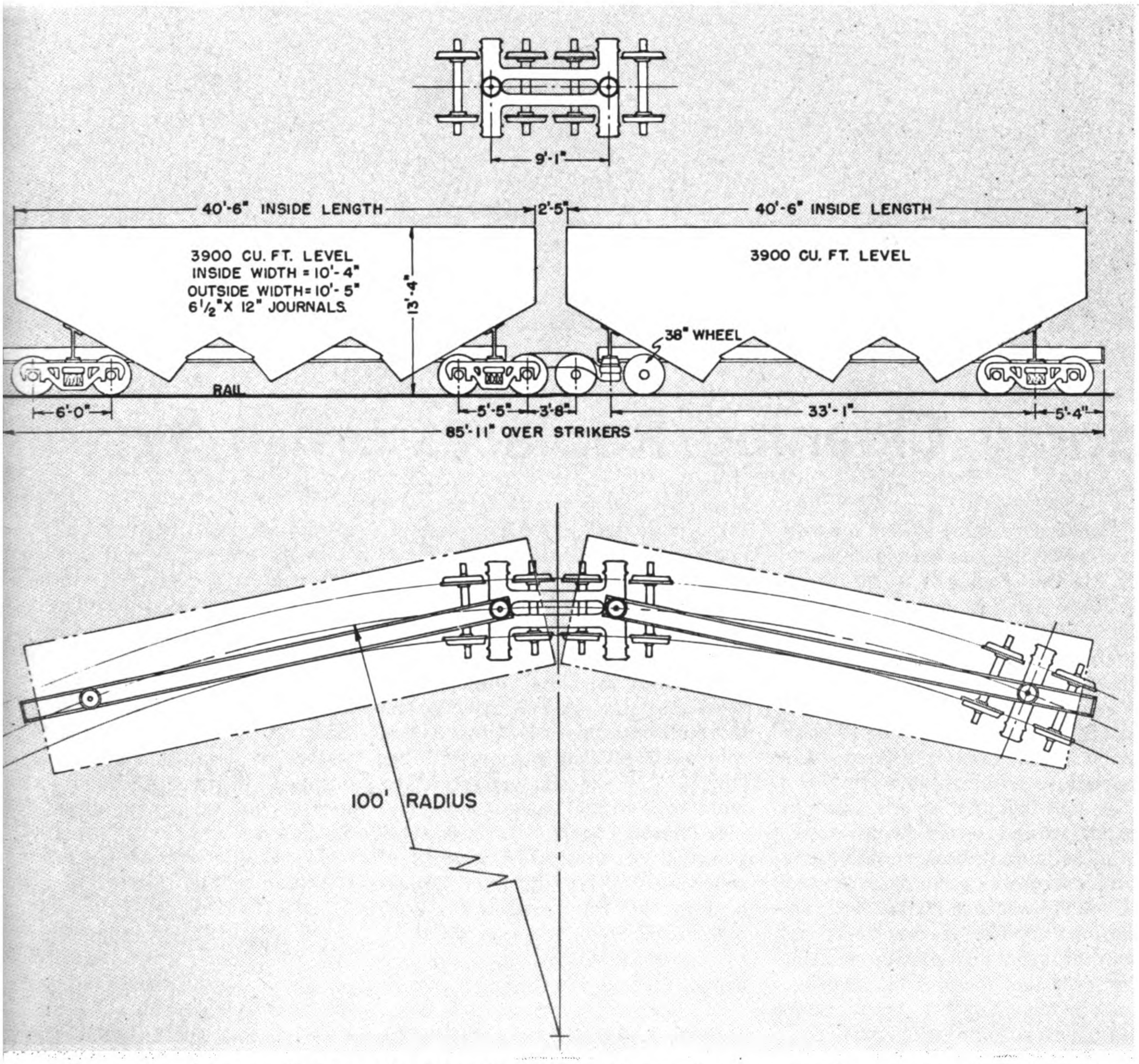
‑AAR Proposes 200-Ton Hopper Car

The railroad industry, confronted ·h the need for increasing the effi- ncy of bulk movements has been ning at cars of higher capacity. test proposal for such a transporta- n tool has been made by the AAR search Center. The AAR 200-ton uplex" hopper car consists of two ·00-cu ft bodies carried on four two- e trucks, the center pair of which joined by a span bolster. Draft and ff between the two units would be taken through this span bolster rather than through an additional pair of couplers and draft gears.

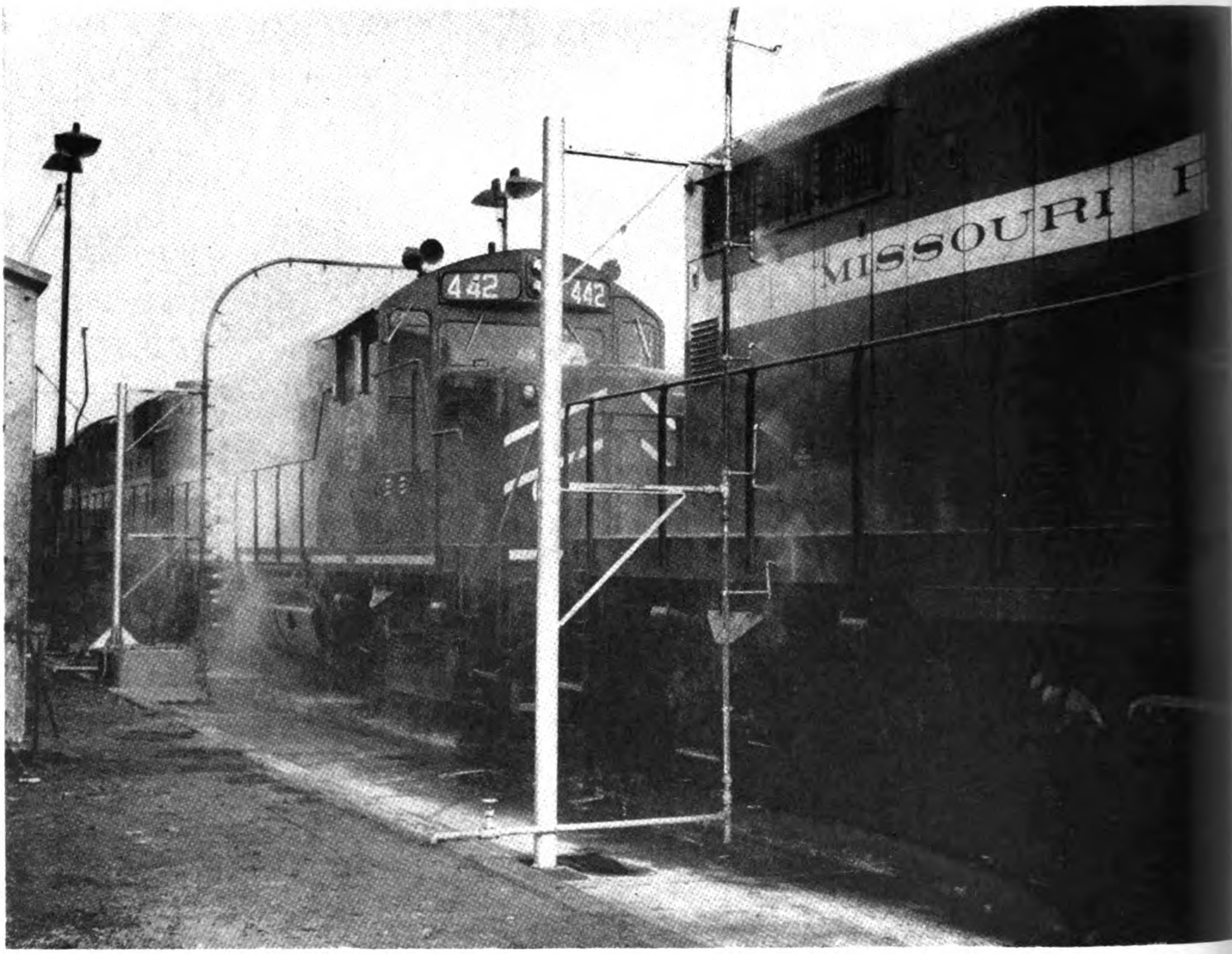
The car is the product of a development undertaken at the request of the AAR Board of Directors. It has now been submitted to carbuilders and to the AAR Mechanical Division General Committee and Committee on Freight and Passenger Car Construction.

While not as radical as some of the other proposals for cars of ultra-high capacity, the design is receiving close study. Previously, the Southern and the Louisville & Nashville had indicated their interest in 200-ton hopper-car designs. The Southern currently operates a large fleet of 100-ton aluminum gondolas (RL&C, June 1960, p 28) and covered hoppers (RL&C, April 1960, p 27). It also is now testing a 100-ton rapid-discharge hopper

(Continued on page 38)



·earance diagram shows the relative flexibility of the design which would present no problems on track with sharp curves. Proposal includes use 38-in. wheels and 6½- x 12-in. bearings on all trucks. Outer ends of units would have F couplers and 36-in. draft gears.



Units proceed at 1-mph speed through the various cleaning stages. New system makes it possible to clean irregular road-switcher profiles.

Spray Cleaning Replaces Brush System

A five-stage spray system for locomotive washing has been installed by the Missouri Pacific at the North Little Rock, Ark., shop, to replace a rotating-brush system. The facility combines the best features of spray-systems used by several railroads. As proof of its successful operation, the road plans to construct similar washers at the St. Louis and Kansas City locomotive terminals this year.

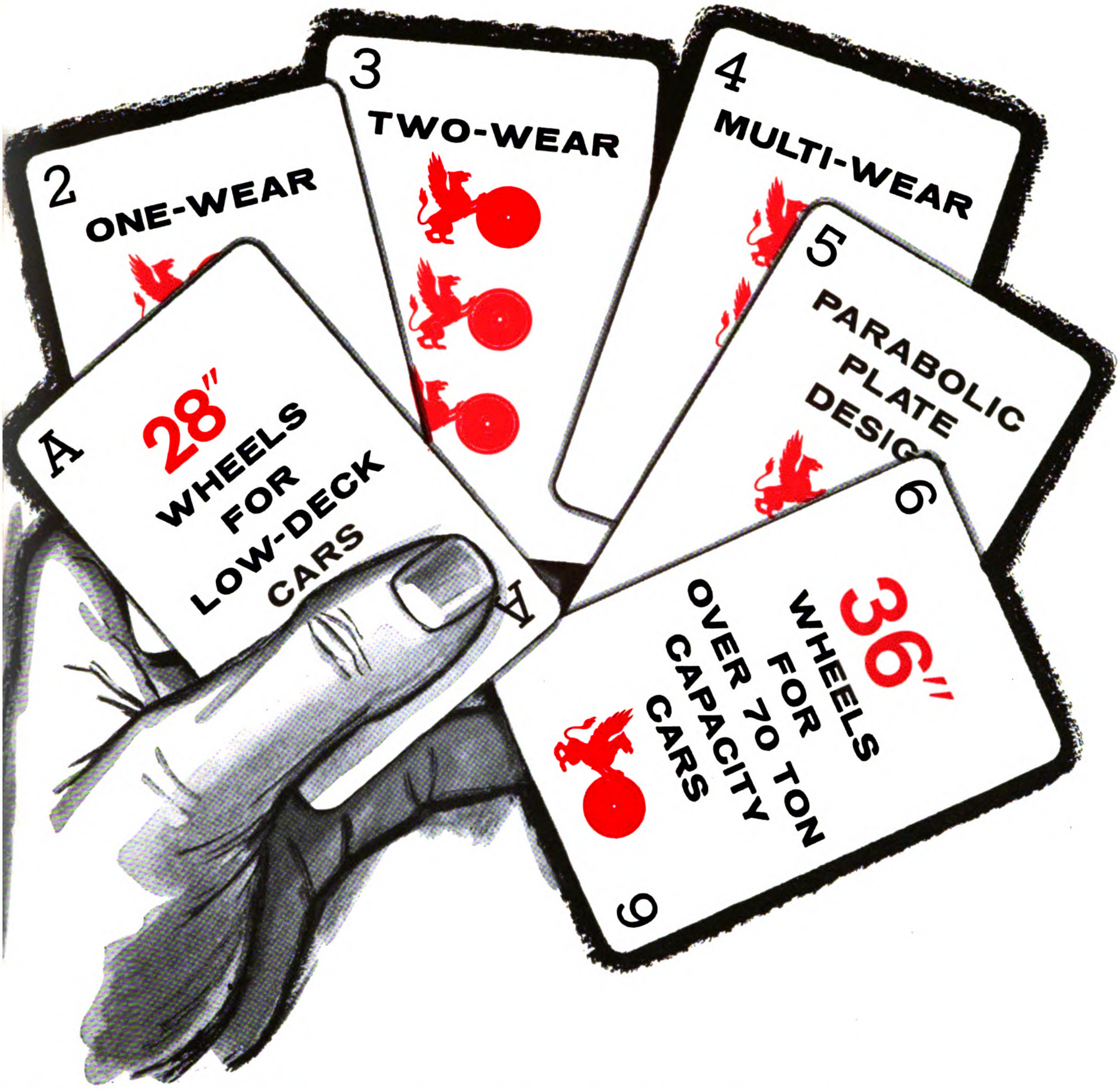
A four-unit consist scheduled for normal washing enters the pre-wetting spray and rolls through the 175-ft concrete paved area at an average speed of 1 mph while acid and alkaline solutions are applied. It emerges 2.5 min later through a high-pressure hot rinsing spray that removes the chemicals and any remaining dirt. Spray nozzles are placed to thoroughly clean road-switcher contours, including areas not reached by rotating brushes. Each spray is controlled by push-buttons, operating only as the locomotive passes through. This permits continued operation of individual sprays should the units require additional cleaning because of road-dirt accumulations.

Following the initial spray of clear water from the pre-wetting hoop, the locomotive travels 24 ft to an acid spray. The alkaline spray is 75 ft beyond. From the alkaline spray, the unit moves 46 ft to the final high-pressure rinsing spray. A centrifugal pump, driven by a 60-hp motor, furnishes the 250 psi final rinse through high-pressure spray nozzles in a 2-in. pipe hoop. Solution sprays set at 35 psi are delivered through 1-in. pipe hoops. Openings in the spray nozzles vary. Sizes and types are still being tested to develop the most efficient for the operation. Tests are also being run to develop effective cleaners and proper solution concentrations.

Trucks are washed with an oil-emulsion cleaner, mixed one part to 10. At the acid spray position, the truck spray, which is on the lower end of the hoop for the acid spray, applies truck cleaner on the trucks at the same time acid is sprayed on the car-body. At final rinsing, the wheel plates are washed by nozzles on the inside and outside of the rails and also by a mixture of hot water and steam from Sellers jets.

The facility is equipped for night operation with ten 750-watt overhead lights focused on the spray stations. A prefabricated building contains three 500-gal mixing tanks, motors and pumps to transfer the solutions from the tanks to the washing system. City water is piped into an 8,000-gal tank at the end of the prefab building where it is heated for the final rinse.

On the New York Central System . . . the Revolutionary GP-30



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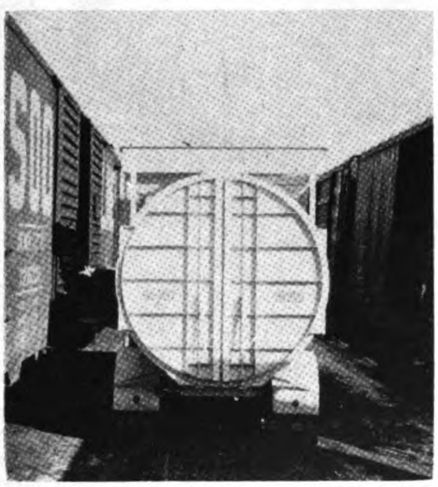
Mobile cleaning truck is equipped with sweeper, washing equipment, material for lining repair, and receptacle for 20 cu yd of refuse.

Mobile Units Speed Car Cleaning



Truck can be operated between cleaning tracks. Its use has speeded the cleaning operation, at the same time making it less expensive.

A less costly, but more efficient, method of cleaning, washing and upgrading freight-car interiors has been installed on the Soo as the result of a system-wide industrial-engineering study. Heart of the system is a mobile cleaning unit which carries all the materials and equipment needed for a complete cleaning and washing job and for minor repairs to car lining. One unit is in service at Schiller Park Yard near Chicago. Two more are scheduled for delivery soon—another for Schiller Park and one for Shoreham Yard at Minneapolis. One existing truck will also be modified and equipped with all the elements of the car-cleaning system for use at Shoreham. Further studies involving Fond du Lac, Stevens Point, Neenah, and Superior Wis., and Duluth, Minn., are under way.

Crews at Shoreham clean about 23,000 cars per year; at Schiller Park, about 18,000. Approximately half the cars cleaned at each yard are also washed. At Shoreham, cleaning and washing costs $213,000 yearly, or $4.08 per car. The new method is expected to save about $119,000 yearly at Shoreham and other locations. Because of the flexibility of the mobile units, savings also will be realized in switching expenses and in per diem costs. Total investment in the four mobile cleaning units will be approximately $52,000.

Each of the Soo's new car-cleaning units is essentially a modified Pak-Mor rubbish truck. The body of the truck will hold 20 cu yd of refuse, compacted as the body is filled by a hydraulic packer piston.

Carried on a special platform at car-floor height is a Tennant power floor sweeper. The truck is equipped with two high-pressure water spray washers manufactured by L&A Products, Inc., a 500-gal water supply tank, and a motor-generator set to provide power for the washers. Also on board are tools and materials needed to cooper the car lining.

All operations for each mobile unit are handled by two men—a carman and a laborer. The car-cleaning is a three-phase work sequence:

- The laborer collects and dumps into the Pak-Mor tank all loose material found in the car. The carman removes any nails protruding from the car floor or lining and begins to repair the lining and door posts if necessary.
- When the laborer has finished dumping the refuse, he sweeps the floor with the Tennant sweeper. The rotating brush and vacuum action of the sweeper combine to remove accumulated dirt and traces of the previous load. The carman, meantime, is finishing the job of coopering.
- If the car is to be washed, each man does half with one of the L&A washer wands. The washers produce a fan-shaped spray at pressures of up to 500 psi. The sprays literally "sweep" the car roof, ends, sides and floor with a minimum of water—about 50 gal per car. Drying time and drainage problems are kept to a minimum. Former car-washing methods consumed about 400 gal of water per car.

When the washing is completed, the two-man crew stows its equipment on the truck and drives on to the next car. The cleaning and coopering operation takes about 12 min; washing, an additional 9 min. The 20-yd capacity of the Pak-Mor body is sufficient to hold debris from about 110 cars.

ICC Inspections Show . . .

Locomotive Condition Unchanged

\verage condition of locomotives :hecked by ICC inspectors in fiscal 962 was unchanged from that of the revious year. "During the year 9.6% f the locomotives inspected by our nspectors were found with defects or rrors in inspection that should have een corrected before the locomotives vere put into use," J. A. Hall, direcor of locomotive inspection, reported o the Interstate Commerce Commission in his annual report. In 1961, .6% of the units inspected had also een found defective.

Along with reporting the virtually nchanged condition of the units inpected—multiple-unit cars, steam loomotives and other-than-steam loconotives, all of which are covered by he Locomotive Inspection Act—the)irector did indicate that there was slight reduction in the number of nits ordered from service. This went rom 504 units in 1961 to 488 in 1962. 'he number of units inspected dropped rom 98,332 in 1961 to 94,592.

In 1962 there was a decline in the umber of accidents resulting from loomotive defects and a reduction in he number of casualties. "Sixty-seven accidents occurred in connection with all types of locomotives in which 73 persons were injured," Mr. Hall reported. "Compared with the preceding year, there was a decrease of four accidents and a decrease of four injuries. Of the 67 accidents, eight were caused by defective condition of the floors, steps and passageways of diesel-electric locomotives. Four of the eight resulted from accummulation of oil on walking surfaces of the locomotives, a decrease of ten compared with the preceding year. Fifteen accidents were caused by defective condition of cab seats, compared with seven in the previous year." There were 13 crankcase or air-box explosions which resulted in 18 injuries. For the sixth consecutive year there were no fatalities resulting from defects. *(over)*

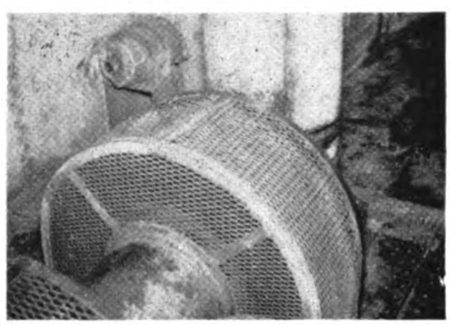
Defective Locomotives and M-U Cars Found by ICC Inspectors

	Locomotives 1961	1962
Units reported	32,074	31,917
Units inspected	95,689	91,493
Units defective	9,000	8,702
Total defects	26,614	24,649
Per cent defective	9.4	9.5
Ordered from service	469	467
	M-U Cars	
Units reported	2,633	2,615
Units inspected	2,400	2,904
Units defective	372	334
Total defects	1,605	1,332
Per cent defective	15.5	11.5
Ordered from service	31	18

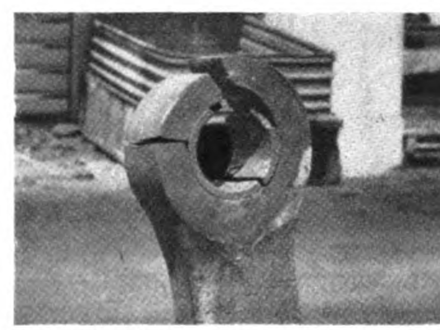
/lost Common Defects on)iesel and Electric Locomotives

'artial list of parts defective, inoperative, r missing, or in violation of ICC rules ound during inspection of 95,689 units in 961 and 91,493 in 1962.

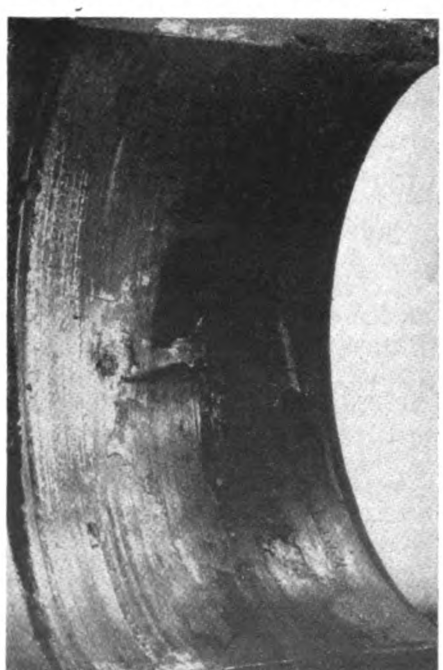
	1961	1962
,ir compressors	208	203
rake equipment	3,066	2,658
oilers	213	190
'ab and cab windows	840	801
'ab floors, aprons, and deck plates	2,235	2,276
ontrollers, relays, circuit breakers, magnet valves and switch groups	565	504
'raft gear	402	349
uel system	2,193	2,184
iears and pinions	156	505
'andholds	210	181
ıspections and tests not made as required	847	685
ısulation and safety devices	163	179
ıternal-combustion engine defects, parts and appurtenances	6,124	5,880
umpers and cable connectors	434	346
\lotors and generators	759	780
anders	3,131	2,351
prings and spring rigging, driving and truck	415	397
teps, footboards, etc.	307	256
rucks	692	657
/heels	805	755
\liscellaneous	1,210	997



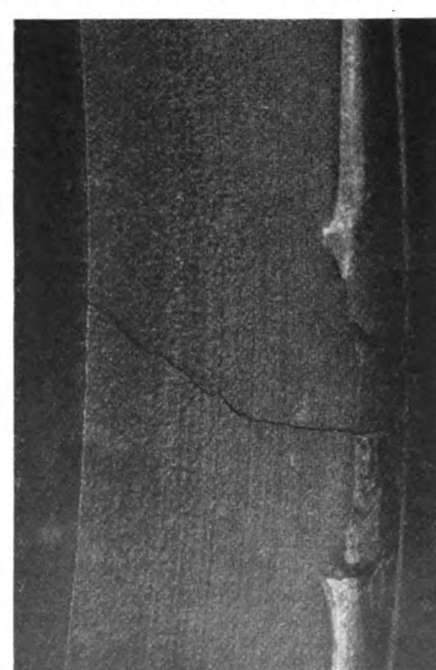
Defective guard over rotating equipment resulted in insufficient clearance. One employee was injured because of this condition.



Broken swing hanger was removed from a diesel locomotive. The unit was ordered out of service by ICC inspector when it was discovered.



Crankshaft bearing was removed from diesel locomotive following crankcase explosion which resulted in injury to one employee.



Cracked wheel was removed from diesel locomotive. Unit had been ordered out of service by Bureau of Locomotive Inspection inspector.

Locomotive defects most frequently found by ICC inspectors in 1961 involved internal combustion engines and their appurtenances (5,880); brake equipment (2,658); sanders (2,351); cab floors and deck plates (2,276); and fuel systems (2,184). Additional details are given in one of the tables. The director annually points out that "if the reported defective parts . . . are considered, those which may be expected to require most maintenance will be indicated, and inspection and repair programs may be set up accordingly."

Cases instituted against railroads for alleged violations of the Locomotive Inspection Act during the year involved primarily Rule 201 (multiple-unit regulations); Rule 203 (trip inspection); Rule 204 (air brakes); and Rule 335 (wire report of injury resulting from locomotive defect).

Safety Appliances

The Section of Railroad Safety of the ICC Bureau of Safety and Service is responsible for inspections made under the Safety Appliance order of 1911 and the Train Brake Law of 1958. The Section's annual report indicated improvement in the observance of train-brake-test requirements and in the quality of air-brake shop and repair track practices. There was an increase in the number of safety appliance defects found on passenger and freight cars and a decrease in the number of defects found on locomotives. The number of air-brake defects observed during these inspections increased from 19,851 in 1961 to 20,432 in 1962.

Among the legal actions instituted by the Section of Railroad Safety was one involving the Carbon County Railway which is now being appealed. In it the judge held that "section 132.13-(e) (1) of the Commission's order of May 1, 1958, required a determination by visual inspection that the brakes applied on each car before such brakes were released and the train proceeded and that such a determination could not be made merely by inspecting the brakes on the last car of the train." Most of the Section's legal actions involved alleged violations of safety appliance laws. During the year ended June 30, 1962, a total of 252 such cases were transmitted to U.S. attorneys. On that date a total of 115 cases were pending in district courts.

Safety Appliance Inspections Cover Cars and Locomotives

	1961	1962
SAFETY APPLIANCE DEFECTS		
Freight cars inspected	1,524,056	1,416,097
Per cent defective	5.11	5.86
Passenger cars inspected	35,396	35,963
Per cent defective	4.91	6.18
Locomotives inspected	111,516	110,007
Per cent defective	1.03	0.78
Number of defects per 1,000 units inspected	54.49	62.24
AIR BRAKE DEFECTS		
Air brakes cut out or inoperative	2,371	3,435
Air brakes not cleaned in required period	10,590	8,288
Excessive piston travel	6,890	8,709
Total defects	19,851	20,432
AIR BRAKE TESTS		
Freight trains observed	5,103	5,276
Average cars per train	62.8	66.3
Per cent properly made	84.2	88.2
Passenger trains observed	1,036	1,106
Average cars per train	12.0	12.7
Per cent properly made	97.1	98.5
Shop procedures observed	1,597	1,972
Per cent properly made	89.5	94.1

Rearranged CN Electrical Shop

(Continued from page 18)

hours, could be saved through improvements in material-handling methods. To eliminate the uneconomical flow and handling conditions, it was decided that three separate working areas should be established:

- Main generator overhaul and assembly—confined to one bay with definite storage areas away from the work in process;
- Traction-motor repairs — concentrated in the adjacent bay except where machines could be serviced by a shop truck;
- Overhaul of locomotive auxiliary equipment and car-lighting generators —separated from the two main operations.

Machine Locations

Lathes and similar machines on which traction-motor and main-generator parts are processed have been located in the main-generator bay because main-generator parts can be handled only by the overhead crane; transport of traction-motor parts by shop truck from between bays does not cause delays and has eliminated the transfer dolly.

Along with elimination of bay-to-bay track dolly, installations such as the degreaser, corn-blast booth, and paint booth were located so they could be served by cranes of Bays 1 and 2.

All varnish tanks and ovens are now located so they can be reached by materials-handling equipment; the degreaser has been equipped with an overhead traveling crane; ovens and vacuum impregnator tanks are served by a two-ton monorail hoist.

Balancing, banding, brazing, and seasoning machines are served by a 2-ton traveling crane.

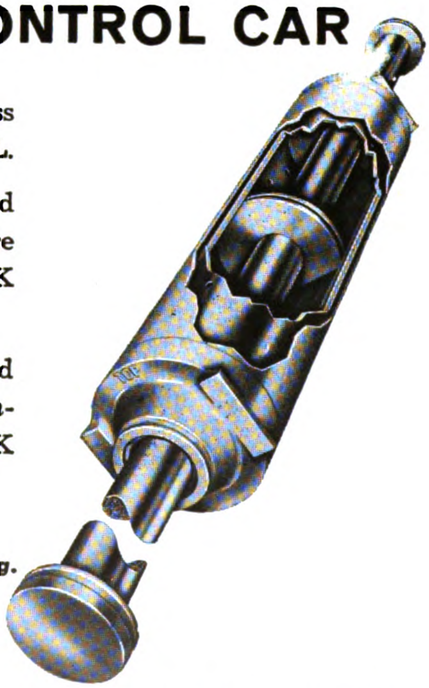
The dolly at cleaning booth was motorized to make it unnecessary for men or shop trucks to move it.

In addition to rearrangement of equipment and provision of new materials-handling facilities, several new parts containers were designed. These included a frame-head pallet rack which is used as a transporting device between cleaning booth, degreaser, and paint spray booth and as a storage rack before final assembly; a pinion rack; pallet baskets which are loaded with auxiliary parts of traction motors and main generators to be moved by hand truck to and from degreaser; conveyor racks and pans used in auxiliary area for transporting small motor parts between benches and to and from the degreaser.

During the course of the study made in 1958, consideration was given to possible expansion. It was predicted by management that the shop work load would double by 1964. The shop layout was found to have sufficient area and machinery for a doubled work load but the shop might not have adequate storage capacity. Adequate temporary and final storage areas are being included which will successfully meet this work load. It was anticipated that there would be an immediate increase in productivity.

Manufacturers and other railroads have visited the remodeled winding shop and have gone away impressed by the efficiency and increased productivity of the shop. Actually, this was the first major work-study project undertaken at Point St. Charles. Its success has been recognized across the system as an example of teamwork. Moreover, it was one of the first projects in what is now a system-wide work-study program dealing with practically all phases of CN operations.

He's all broken up over the fact they didn't ship him in a KEYSTONE SHOCK CONTROL CAR



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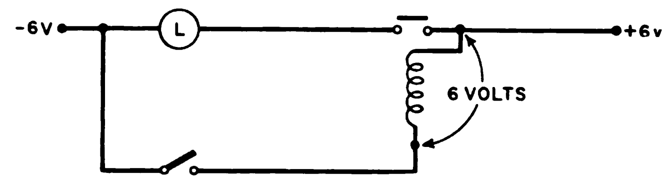
Understanding Semiconductors

Part 3—Transistors

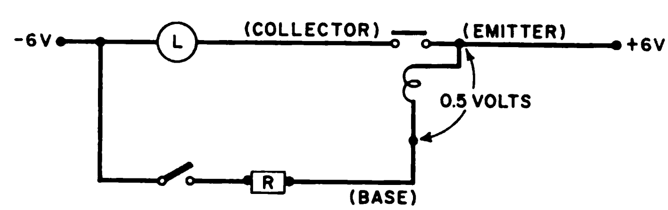
By R. L. Brittin

Transistors are frequently used as switches or relays. Shown is a conventional relay. When the control switch is closed, battery current passes through the operating coil



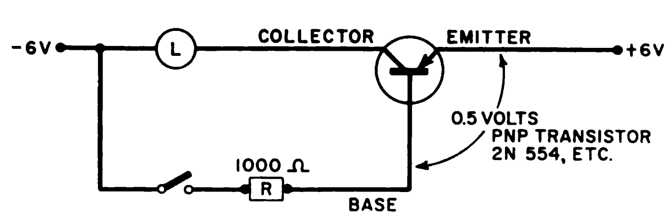
closing the power contacts and the light is energized.

Here is the same relay, except the operating coil has been rewound with only a few turns of heavy wire. Transistor nomenclature has now been added for reference

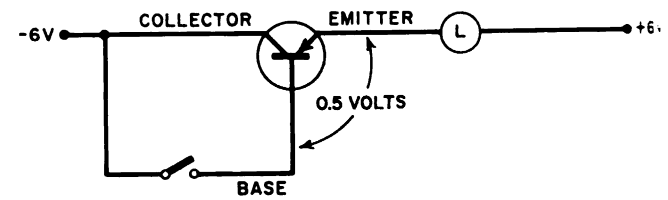


only. Because of its low resistance, the coil will now operate on 0.5 volt and it is necessary to add resistor R to prevent damage to the coil. This relay can now be replaced directly with a transistor.

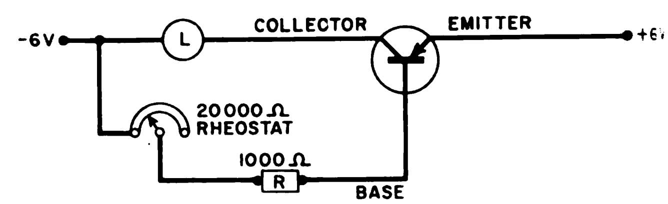
Notice that the transistor nomenclature used on the last relay example is used again, this time applying to the actual transistor. When the switch is closed, battery current flows in the emitter to the base (control) circuit, causing the emitter-to-collector (power) circuit to conduct and the light is energized. Notice that the resistor R has been left in the circuit so that full battery voltage is not applied to the control element. With a relay, the power contacts will switch a large current when only a few amperes are flowing in the operating coil. Similarly, if the two circuits of the transistor "switch" are metered, it will be found that the lamp current is as much as fifty times that flowing in the base circuit. Should this be the case, it would be said that the transistor has a "current gain" of 50.



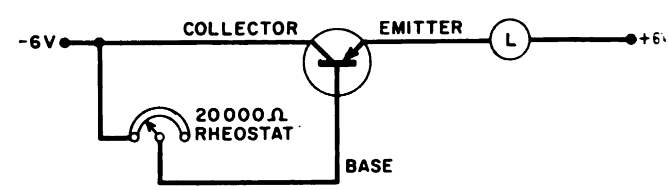
Some circuits are such that they can be rearranged to eliminate the resistor R. In this circuit, the voltage drop in the lamp prevents application of full battery voltage to the emitter-base circuit. As in the previous illustration, a meter in the base will show that it carries only a fraction of the lamp current, with the emitter-collector path carrying the major part of the load.



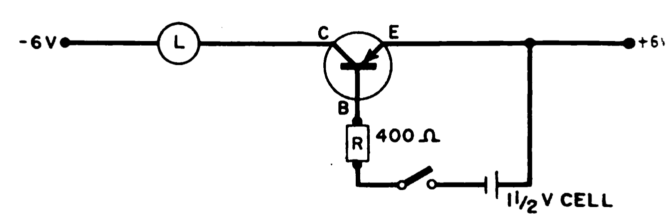
With only a minor addition to the switching circuit, the transistor can be made to perform as a variable resistor. By running the rheostat up and down, we change the



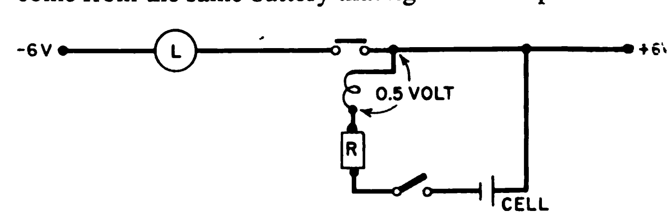
amount of control current flowing in the emitter-base path which, in turn, controls the brilliance of the lamp by changing the resistance of the emitter-collector path. As before



only a small amount of power is necessary in the base to control a larger amount in the emitter-collector circuit. In actual service, the rheostat would not be used. The base would receive a variable negative control voltage signal from some sort of automatic sensing device.



It is not necessary that the negative feed to the base come from the same battery that lights the lamp. We have

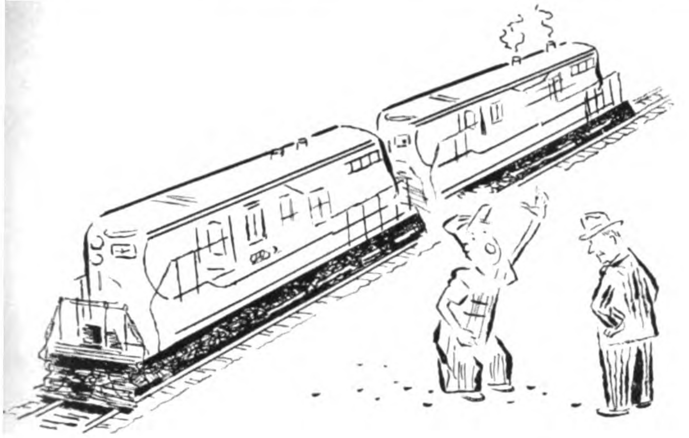


done this only because it happened to be convenient in this case. Actually, all that we have to do to make the transistor conduct is to make the base more negative than the emitter. This can be done by inserting another cell in the system.

This has its counterpart in a standard relay circuit.

Third of a series of articles explaining basic semiconductor operation and testing, originally prepared for Illinois Central electrical department employees. Mr. Brittin is IC traveling electrical inspector. Part 1 appeared in Dec. 1962 issue, p 41; Part 2, in Jan. issue, p 41. Concluding installment will appear in the March issue.

From the Diesel Maintainer's Note Book



Ideas Don't Work Unless You Do

By Gordon Taylor

"I don't see why you claim that," said Ned Newman. He and Bud Jones, apprentices at the Centerville diesel shop, had just come out of the apprentice classroom and were discussing a question about diesel locomotive power. "Let's have Doc Watts decide."

The two stepped into the diesel shop office to see Doc. "We'd like for you to settle a question for us." said Ned. "It's about horsepower. I claim that an Electro-Motive diesel engine is working harder pulling a train on a grade at 15 mph than it is when moving 50 mph on level track. Bud claims it is just the other way. He says that the unit running at high speed is working harder. Which of us is right?"

"You're both wrong," replied Doc.

"How could we both be?"

"When you say a diesel engine is working harder," Doc explained, you must mean that it is consuming more fuel at that moment. You must understand that the work it can perform depends upon the amount of fuel consumed. When we speak of a diesel engine having a 1500-hp rating, we mean it can convert enough fuel to produce 1500 hp of mechanical energy.

"Getting back to your question, I understand you to mean that the diesel engine would be operating in 8th throttle position at both train speeds. The only way they can be compared is to have them operating at corresponding throttle positions. I assume you meant with full throttle. When you stated your question, you were really asking which case required the most fuel. The reason that I said you were both wrong is because the fuel consumption would be identically the same in both cases. In other words, these power plants would have constant power output at full throttle or at any corresponding lower throttle position. Is that clear?"

"I guess it is," Ned replied. "It also answers the question about why we are attending apprentice classes. Would you mind going a step further, telling us how the diesel locomotive maintains the constant power output that requires these constant quantities of fuel?"

"I'll do my best. I'm glad to see that you have grasped the idea that the horses that pull the train are initially locked up in the locomotive's fuel tank. When the engines burn the fuel to release this power, it is passed to the main generator. The generator passes it on to the traction motors and they, in turn, pass it to the driving wheels which grasp the rails and pull the train.

"The constant power output is maintained by the action of the load regulator and the design characteristic of the d-c generator. In the main generator the voltage and amperage rise and fall like two men on a seesaw; the voltage goes up and the amperage comes down as the train speed increases. When the train speed decreases (as when ascending a grade), the amperage goes up and the voltage comes down. In both instances, the product of volts times amperes, the power output of the generator, is the same. Whatever the variation of volts and amperes, they produce a constant wattage value at any given setting of the engine throttle. The reason is that high volts times low amperes produce the same wattage as high amperes times low volts.

"The generator, of course, cannot put out more electrical power than the engine delivers to it in the form of mechanical power. The generator converts it into electrical power.

"The load regulator is the device that loads the engine according to the throttle setting in the cab. It automatically maintains a constant horsepower output corresponding to each throttle position over the entire range of locomotive speeds.

"For the purpose of load regulation, determination of horsepower output of the engine is based on the rate of fuel consumption. This is indicated by the relationship between the speed setting of the governor and the position of the power piston that controls the opening of the fuel injector racks.

"If the engine demands more fuel than a predetermined setting or balance point, the regulator reduces the load on the engine by reducing field excitation, the battery-field current of the main generator. This reduces the power output to balance with the fuel consumption.

"If the engine requires less fuel than the predetermined setting, the load regulator increases the load on the engine by increasing the field excitation of the main generator. This causes a load change that will increase the fuel rate to a proper point of balance. The load regulator has two principal components: first, the pilot valve which is in the governor, and a self-contained unit consisting of a hydraulic vane motor attached to a commutator type rheostat. This controls the valve of the exciting current in the battery field to control or adjust the power output of the main generator.

"Does this clear up your question?"

"It does," said Ned, "and you have made it so interesting that I would like to ask just one more. If I were riding a diesel locomotive, is there any way

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

I could tell by looking at the engine if it is putting out power?"

"There is, indeed," replied Doc. "There are two pointers on the cover of the engine governor. One of these pointers indicates the throttle position of the engine and is labelled 'Speed.' The second pointer is labelled 'Fuel.' It indicates the position of the governor power piston in sixteenths of an inch. The lower the number on the fuel scale the greater the quantity of fuel being injected into the cylinders.

"In No. 8 throttle (speed) position, the fuel indicator pointer should read between 5 and 6 if the engine is properly loaded. If the fuel indicator points to 8 or higher, the engine is not loaded and there is probably electrical trouble. In that case, you might check the battery field fuse to see if it is blown, or you could check control air pressure on our older model units.

"If the governor indicator plate shows excessive fuel consumption, indicated by a lower number on the fuel scale, there is probably engine trouble. Its cause should be determined. I believe this is as far as we can go in this explanation until we can get out on a locomotive and examine the things we are talking about."

Just then a call came over the intercom speaker asking Doc to come to the service track where they had a unit in trouble. Doc arrived to find a two-unit GP-7 locomotive with Maintainer Tom Evans awaiting him.

"This is my first time to have an engine that wouldn't shut down when the throttle is moved to 'Off' position," explained Tom.

"Is it in the control unit?"

"No, the control unit is OK. Its engine stops, but, in the trailing unit, the engine keeps running at 'Idle.' "

"You can always stop it," said Doc, "by pulling the engine lay-shaft handle closed until the engine stops. Do that and put the isolation switch in 'start' position until we get ready to start up.

"Now let's think what would be the most likely cause of trouble. The thing that brings an engine to a stop when the throttle is moved to 'Off' position is action of the DV control solenoid in the governor which must be energized to work properly. Since the lead unit shuts its engine down when the throttle is placed in 'Off,' then the trailing unit must be failing to get from the lead unit the control signal needed to energize the DV solenoid. The throttle drum switch on the lead unit notifies its governor to shut its engine down but fails to get the message to the rear unit.

"The most likely location for trouble would be the trunk line control wire DV3 leading to the trailing unit. First place to look is in the jumper cable. Replace that cable and start the engines."

When the engines were started and placed on the line, everything worked perfectly and the engines shut down promptly when the throttle was moved to "Off" position.

"It was just a case of a broken DV3 wire in the jumper cable."

"That," said Tom, is trouble shooting like I would like to be able to do it. How do you do it, Doc?"

"Well the best way I have found is to familiarize yourself with the duties of various control devices so you will understand the part each plays in producing proper operation of the unit. Then when trouble arises, ask yourself the right questions and be hard to satisfy when you answer them. Above all, follow a plan in trouble shooting. Without a plan you are simply shooting in the dark.

"While we are talking about troubles caused by open circuits from the throttle control drum, you should remember that engine shutdown and speed control get their orders from that point. Starting at the top of throttle control drum there are several important connections:

- *Contact 1* completes the circuit to the DV solenoid. If contact is bad the engine would run two speeds high in Throttle Positions 5 and 6 and could not be stopped with throttle.
- *Contact 2* must be good. It is used in all engine speeds.
- *Contact 3* completes the CV solenoid circuit. If there is a connection, the engines would run two speeds low.
- *Contact 4,* the BV solenoid contact, if bad, will cause the engine to run four speeds low.
- *Contact 5* makes the connection for the GF6 trunk wire in the control cable. If connection is bad, it will interfere with excitation of the battery field in the main generators.
- *Contact 6* must be good. It connects the AV solenoid. If connection is bad, the engine would be running one speed low.

"All these throttle-drum contacts connect with wires in the trunk control cable. Any break in these wires or in jumpers causes the same trouble.

"You may not remember all of this," said Doc. "It helps, if you will just remember that engine speed control signals originate at the throttle drum in the control unit. Solving troubles involving engine speeds should include tracing circuits between the throttle drum and the engine governors.

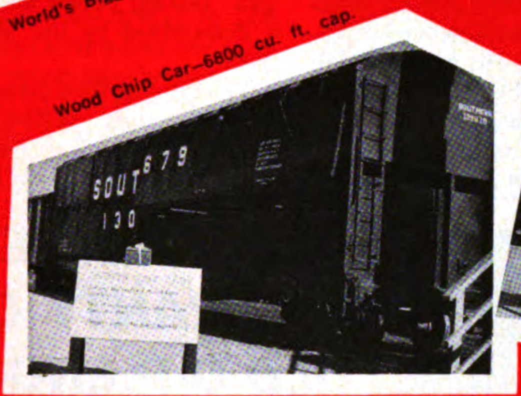
"Speaking of ideas," said Doc, "they are funny things; they never work unless you do. I have an idea that I'm needed back at the office."

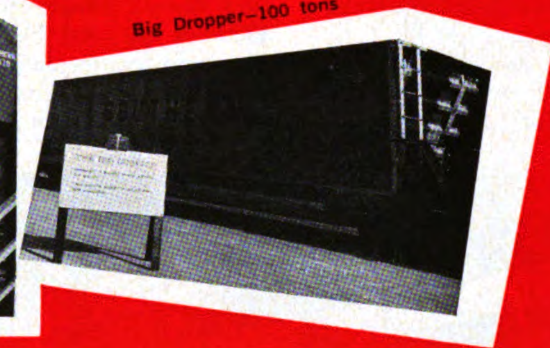
PROGRESS

World's Biggest Box Car


Silversides—high capacity coal gondola


Big John—100 tons or more


Wood Chip Car—6800 cu. ft. cap.


Big Dropper—100 tons

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With the aim of reducing transportation costs and increasing efficiency, The Southern Railway designed and built these and other ultra-modern, high capacity freight cars—each "custom tailored" to individual shippers' needs. Here are some examples of Southern's "imagination on wheels" recently sent on a system-wide tour.

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What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted by LMOA members, those sent to the Editor by other readers are welcomed and published.

Armatures Restored

What is the most effective and economical method for replacing the insulation binders in traction motor and generator armatures when they are being given a basic repair?

Insulation deterioration in traction motors and generators is caused by

- Thermal aging, resulting from the effects of time and temperature;
- Thermal degradation resulting from excessive current or lack of sufficient cooling air;
- Physical damage from vibration or mechanical stresses.

Ungrounded insulating systems which develop these defects can be made suitable for further service by effectively filling the voids surrounding the deteriorated binding material.

There are three primary methods used to replace defective insulation binders.

Method 1 This method employs an open dip tank which will allow the armature under reclamation to be submerged completely in the filling material. There are two variations in the process. One is to dip the armature at room temperature and the other is to heat it to 120 deg F prior to dipping. The armature remains under the filling material until maximum penetration is achieved, indicated by absence of bubbles rising through the liquid. Both methods are used, but neither results in a void-free insulating system. The moisture barrier is limited.

Method 2 The armature being treated is preheated and then alternately rotated in filling material and under drying units. This results in a surface build-up which gives an excellent moisture resistance, but does not penetrate into voids created by binder deterioration.

Method 3 A combination of vacuum and pressure is used to produce a void-free fill of the armature undergoing reclamation. This is accomplished by preheating the unit to 120 deg F and drawing a vacuum of 28.5 in. mercury or more. With this vacuum maintained, the armature is submerged under the filling material as a gas pressure of 80 to 120 psi is applied. This pressure is held for 16 hr, giving the filling material time to enter all the void areas. The duration of this pressurizing does depend on the amount and location of the fill required. The armature is then removed and baked in an oven while being rotated at 2 rpm. Baking period and temperature is determined by the filling material used.

The third method gives a solid, void-free insulating system with good thermal conductivity, high resistance to moisture penetration and mechani-

ıl vibration. While the equipment quired to vacuum impregnate, bake, ıd roll-cure the armature is relatively :pensive, the extended armature serve life does merit the additional costs volved.

. J. Frey, electrical department foreman, Rock Island.

ɨigh-Speed Slips

'hat can be done about damage › traction motors caused by unɔntrolled high-speed wheel slips?

'ne of several causes for this type of amage is lubricants on rail surfaces : rail crossings and turnouts. This is articularly true during the hot sumıer months. When enginemen and thers report these locations, investiıtions should be made.

We are continually trying to find :onomical ways to improve the presıt wheel-slip recognition and control, articularly for units in freight service.

In an attempt to reduce this motor amage, all GP9 units are being given ıese simple wiring changes:

. The wheel-slip series (SWW) ciruit is modified to give some protecon in parallel as well as in series. 'his is done by paralleling a P1 c-d nd a P4 c-d interlock and wiring this ombination in series with the standrd S24 c-d interlock.

. Auxiliary wheel slip relay (AWS) ; removed from its pilot function by 'iring the shunt field (SF c-d) interɔck in the same circuit that originally ontained the AWS a-b interlock. The ʌWS relay is now used as an overspeed ontrol relay (OCR) which is enerized by the speed recorder plunger nd micro-switch (OCS). The plunger ; set, and a jam nut applied, so OCS loses at 67 mph. When OCS does lose, it will energize OCR which will rop shunt field (SF) and battery field BF), at the same time energizing the 'heel-slip light. The present instrucons for wheel-slip correction apply. 'he OCR is operative with any comination of motors cut out.

. The traction motor field-shunting ontactor (FS) is inoperative when ny combination of motors is cut out. 'his is done by wiring the spare, norıally closed, traction motor cut-out elay (COR) interlock in series with he FS coil.

:. J. Frey, electrical department superisor, Rock Island.

AAR Proposes 200-Ton Hopper

(Continued from page 21)

car. D. W. Brosnan, Southern president, has mentioned his road's interest in car capacities of up to 200 tons and at one time indicated such a bulk-commodity car might be of articulated design.

The L&N has operated three 100-ton rapid-discharge hopper cars experimentally, one for well over a year (RL&C, April 1961 p 22). The three cars, built of low-alloy high-tensile steel, were of different designs. Following its initial experience with these cars, the L&N hinted at the possibility that they might be followed by a 200-ton car.

Advantages of Design

Advantages claimed for the AAR duplex hopper car design are:

- Short coupling between the pair of 100-ton bodies, with a minimum coupled length;
- Minimum light weight;
- Single brake system for the two units;
- Absence of clearance restrictions;
- Lends itself to conventional or integral train consists.

Because draft and buff would be taken through the span bolster rather than through couplers and draft gears, a deeper center plate engagement would be used than is now standard for single cars of the same center plate load. Bolster jaws on the truck side frame pedestals might also be rearranged to permit additional alignment. The rigid wheel base of 14 ft 6 in. is not in the same category as the four-axle truck used under some steam locomotive tenders in years past. The arrangement of the truck would permit an alignment of wheels and axles not possible in an integrally cast four-axle truck. The center offset on a 14-deg curve is only about ¾ in. and does not occur at the location of the center pairs of wheels.

Estimated light weight of the car is 112,000 lb and load limit on eight 6½ x 12-in. axles would be 414,000 lb. The car is designed to be mounted on 38-in. wheels. It would be fitted with 36-in. draft gears. Overall coupler length would be 88 ft 5 in.; outside width, 10 ft 5 in. Cubic capacity is based on inside side-stake construction.

Personal Mention

ıska Railroad.—*Anchorage, Alaska:* JOHN DARBY, JR., appointed mechanical engi- :r.

ɜ-Lackawanna.—*Cleveland, Ohio:* EARL D. .LL, mechanical engineer, retired. *Hor- 'l, N.Y.:* EARL BRANNING, master me- ınic, diesel shop, retired.

esapeake & Ohio.—*Huntington, W.Va.:* J. HENSHAW appointed assistant general ıster mechanic, succeeding D. H. RICH- ›ND, retired. H. R. BAYS appointed assist- t superintendent car department, succeed- ; Mr. Henshaw. R. L. PERKINS appointed ;istant general car inspector, succeeding L. ERWIN. *Ashland, Ky.:* M. I. TAYLOR pointed general foreman, succeeding F. CRAFT, deceased. *Wallbridge, Ohio:* R. ERWIN appointed general car foreman, :ceeding Mr. Bays.

ıicago & Western Indiana.—*Chicago:* J. M. ııLIPS appointed master mechanic follow- ; termination of joint interests of the ;WI and the Belt of Chicago.

sco. — *Springfield, Mo.:* JOHN P. FITE, ief chemist, appointed engineer of tests, cceeding Max A. Herzog, retired.

nois Central.—Chicago: L. R. BARRON ap- ›inted superintendent Burnside Shop, suc- eding CARL A. NORSTROM, retired. HARRY KENNEDY, JR., appointed general fore- an, Weldon Coach Yard, succeeding Mr. ırron. G. F. BROOKS, car inspector, ap- ›inted gang foreman, Burnside Shop, suc- eding Mr. Kennedy. H. V. LAWRENCE neral foreman, Burnside Shop.

uisville & Nashville.—*Corbin, Ky.:* W. C. ARLETTE appointed master mechanic, ımberland Valley and Knoxville and At- ıta divisions, succeeding J. W. STEPHENS, ceased. *South Louisville, Ky.:* FRED J. .ASPOEHLER appointed general foreman, ɜsel shop, succeeding Mr. Marlette. *Louis- 'le, Ky.:* WILLIAM A. RICE appointed staff sistant motive power, taking over the du- s of assistant superintendent of motive ›wer-operations, formerly handled by Mr. aspoehler. W. R. BACON appointed staff sistant—motive power.

nnsylvania. — *Philadelphia, Pa.:* RICHARD FRANKLIN, director, industrial engineer- ;, appointed chief mechanical officer, suc- ɛding L. E. GINGERICH, retired. Mr. anklin, prior to his association with the nnsylvania, was assistant vice president- ɜchanical, Southern.

nta Fe.—*Amarillo, Tex.:* L. L. LUTHEY pointed mechanical superintendent, West- n Lines, succeeding A. J. HARTMAN, de- ased. *Los Angeles, Cal.:* L. B. ENGLISH pointed general master mechanic, succeed- ; Mr. Luthey. *San Bernardino, Cal.:* F. KANIVE, appointed superintendent of ops, suceeding Mr. English. *Argentine, ın.:* J. D. SWAUGER appointed to newly eated position of superintendent of shops, th jurisdiction over Kansas City Division.

Position of master mechanic at that terminal abolished. *Newton, Kan.:* Jurisdiction over all parts of Eastern, Middle and Oklahoma divisions assumed by W. R. COWDREY, general master mechanic. *La Junta, Colo.:* V. R. CARLSON appointed master mechanic, succeeding Mr. Swauger. *San Diego, Cal.:* P. W. BURKETT appointed division foreman, succeeding Mr. Carlson. *Chillicothe, Ill.:* I. A. WEBB appointed to newly created position of mechanical foreman.

Southern.—*Knoxville, Tenn.:* ROSCOE H. BIBLE, general foreman car repairs, appointed assistant manager, Coster Shop.

Western Maryland.—*Hagerstown, Md.:* DAVID W. PIPPINGER appointed superintendent car equipment.

Supply Trade

ELLCON-NATIONAL, INC. — *Emil P. Kondra,* vice-president of sales and assistant to the president, elected president, succeeding *C. T. Stansfield,* now chairman of the board. *Robert A. Nitsch,* sales manager, appointed assistant vice president — engineering and production. Mr. Kondra became vice-president of sales in 1955 and, in January 1961, also assistant to president.

PULLMAN-STANDARD.—*W. B. Brown,* sales and service engineer, appointed assistant manager of sales and service engineering division, with headquarters at Hammond, Ind.

G. S. Stansfield

E. P. Kondra

Ellcon-National

J. S. Hutchins

ABS

A. E. Brown

Wyandotte

WYANDOTTE CHEMICALS CORP., J. B. FORD DIV.—*Albert E. Brown* appointed special representative — railroads, serving southeastern part of country. Mr. Brown formerly with Prime Manufacturing Co.

AMERICAN BRAKE SHOE CO.—*John S. Hutchins* elected president and chief operating officer. As president, he succeeds *Kempton Dunn,* now chairman of the board and chief executive officer. Mr. Hutchins, who joined the company's sales department in 1925, has been executive vice president since 1956.

ELECTRO-MOTIVE DIV., GENERAL MOTORS.—*E. Chernoff* and *J. C. Singleton* appointed sales engineers, Sales Engineering, La Grange, Ill. *T. Fernandez* and *W. R. Mylenbusch* appointed district engineers, Southwestern and Eastern Regions, respectively. W. I. HOFFMAN, district engineer, Eastern Region, appointed Regional parts sales representative Eastern Region, with headquarters in New York.

TIMKEN ROLLER BEARING CO.—Railroad Division appointments: *John F. Byrom,* district manager, Philadelphia; *Glenn E. Neal,* district manager, Atlanta; *Neil B. Stark,* assistant district manager, St. Louis, and *Jack R. Monday,* assistant district manager, Atlanta.

AMERICAN CAR & FOUNDRY DIV., ACF INDUSTRIES.—*Donald B. Howard* appointed manager of cushion underframe sales at New York. H. BEN YOUNG, vice president of engineering and research, ACF Industries, elected also vice president of manufacturing and research, ACF Industries, succeeding *Wilbur E. Lunger,* retired.

ST. LOUIS CAR DIV., GENERAL STEEL INDUSTRIES, INC. — *Ferris P. Beardsley* appointed assistant manager of sales. Mr. Beardsley formerly marketing manager, Alco Products, Inc.

YSTONE RAILWAY EQUIPMENT .—*Bruce O. Breon* appointed engineer of construction. Mr. Breon formerly asso- ed with New York Central, Despatch ps.

.AND STEEL CO.—*Kenneth J. Burns* ointed assistant general manager of s.

ION RAILWAY EQUIPMENT CO.— v sales representatives: *Hardy G. Rey- ds, Jr.*, 3941 Kipling ave., Minneapolis Minn., covering sales of Ureco devices he Twin Cities-Green Bay area; *Clarence Turner*, Western States Supply Co., 1517 rney, Omaha, Neb.—Omaha-Denver- t Lake City-Anaconda-Oelwein terri- y; *Paul V. Miles*, Paul V. Miles Co., 1485 rshore Blvd., San Francisco 24, Calif.— st Coast territory, including San Fran- :o, Los Angeles, and Portland; *Melvin H. ank*, M. H. Frank Co., Marshall Bldg., :veland 13, Ohio — Cleveland-Detroit a.

OR & CO.—*Frederick A. Fielder*, cor- rate vice president, elected president, suc- ding *Richard A. McLaughlin*, retired. . Fielder, prior to October 1962, had n vice president of sales, Baldwin-Lima- milton Corp.

OULD-NATIONAL BATTERIES, INC., DUSTRIAL BATTERY DIV.—*Donald Con- ker* named district sales manager, South- st Region, with headquarters in La Pu- te, Calif. Mr. Connaker formerly dis- ct manager at Baltimore, Md., sales of- e. *P. R. Heaton* transferred from field gineering, St. Paul, Minn., to sales, Pitts- rgh, Pa., area.

NITED SHOE MACHINERY CORP., B. CHEMICAL DIV.—*John F. P. Hoare* ap- inted sales representative for Thermogrip t melt adhesives and coengineered apply- g equipment and Bostik adhesives and atings, mid-Atlantic area, reporting to ew York regional office.

AGOR CAR CORP.—*Frederic J. Sch- eder* named president, succeeding *Lewis Haight*, retired. *Nicholas De Roos* named rector product development—sales, and *orris Warshal*, chief engineer.

NSUL CHEMICAL CO.—*James B. Reed* pointed sales manager, Northern Region, d *Burton L. Felldin*, sales manager, ortheast Region, Fire Protection Products iv. Mr. Reed located in Chicago; Mr. :lldin, in Paoli, Pa.

EDERAL-MOGUL-BOWER BEAR- IGS, INC., FEDERAL-MOGUL DIV.—*B. H. ckles, Jr.*, appointed to newly created po- ion of Western regional sales manager. *hn R. Costello* appointed sales manager, istern Region.

ATIONAL ELECTRIC COIL DIV., cGRAW-EDISON CO.—*Fred W. Kirby*, vice esident and general manager, named ex- cutive vice president; *Nathan J. Green*, anager of engineering, appointed man- ger, Columbus, Ohio, plant, and *Bailey E. rice*, sales manager, named manager of arketing.

KOPPERS CO., WOOD PRESERVING DIV.—*Don C. Smith* named West Coast sales manager, Los Angeles, Calif. *Burnett G. Bartley, Jr.*, appointed sales manager at Pittsburgh.

GENERAL AMERICAN TRANSPORTATION CORP.—*F. Walter Horner*, director of engineering, elected vice president-engineering and technical services.

COLORADO FUEL & IRON CORP.—*Howard S. Christie*, assistant director of sales, national accounts, appointed director of sales, national accounts, with offices both in New York and Denver.

INTERNATIONAL-STANLEY CORP.—*Olaf N. Rye* and *William E. Bruning* elected vice presidents, with headquarters at New York and Omaha, respectively.

OKONITE CO.—*Julian R. Hoss*, district manager, Atlanta sales office, appointed manager—southern sales region.

AMERICAN STEEL & WIRE DIV. OF UNITED STATES STEEL CORP.—R. P. Moffett, sales manager, heads newly formed southeastern area electrical sales office in Fairfield, a suburb of Birmingham, Ala. *E. D. Hunter* named electrical sales engineer; *G. F. Hannon*, salesman; and *W. J. Forrester*, service manager at Birmingham. *U. D. Burk* will manage new Houston electrical sales office. *A. H. Crane* named salesman, and *A. D. Graham*, service representative at Houston.

Report

(*Continued from page 8*)

his corporation's position was the same as that taken when the Justice Department undertook its criminal suit in 1961. At that time Chairman F. G. Donner commented: "It is difficult to understand why, after so many years of business operation by General Motors in this field, with so much data and information known to and available to the government, it should now file this proceeding. General Motors is proud to stand on its record in the development, production and sale of diesel-electric locomotives which demonstrate a major contribution to the railroad industry and to the transportation economy."

The new complaint, describes GM as "the largest manufacturing corporation in the United States," and goes on to say that, in 1961, it made "approximately 80% of all new and rebuilt railroad locomotives manufactured in the United States." It is also stated that GM "has been the largest commercial shipper of freight on the railroads of the United States, accounting for well over $200 million per year in freight revenues."

The only other companies "currently engaged in the manufacture of locomotives" are identified as Alco Products, Inc., and General Electric Co. During the period between Jan. 1, 1961, and Sept. 30, 1962, Alco obtained "only 11%" and GE "only 8%" of the new and rebuilt locomotives ordered for domestic service, the complaint also stated. As to other builders, it had this to say: "Fairbanks, Morse & Co. . . . has not sold a new locomotive to a domestic railroad since 1958. Baldwin-Lima-Hamilton Co., a pioneer in the industry, has not sold a locomotive since 1956."

After setting out the foregoing, the complaint charges GM has "unlawfully" monopolized" the domestic market for new and rebuilt locomotives by such practices as giving preference in routing freight traffic; building or locating GM plants or other facilities; financing or assisting in financing locomotive purchases.

The complaint's "prayer" asks that GM be found to have violated the Sherman and Clayton acts, as alleged, and also seeks "relief," including the following actions by the defendant:

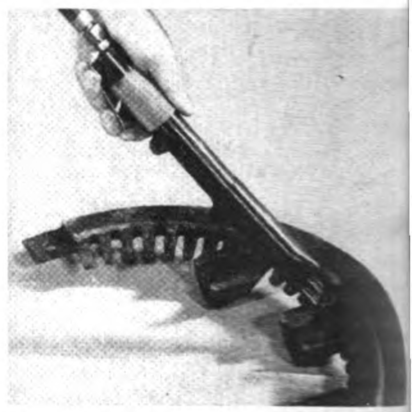
- That GM be ordered "to divest itself of its Electro-Motive Division and such other of its assets as may be necessary to establish such Division as an independent supplier of railroad locomotives, service facilities and parts;
- That pending completion of the divesture, GM be enjoined from engaging in any of the alleged practices which are the basis of the complaint, "or in any other practices or conduct having similar purpose or effect;"
- That GM be enjoined from acquiring the stock or assets "of concerns primarily engaged in the production, sale or rebuilding of locomotives . . . or primarily engaged in the production and sale of principal components of locomotives."

What's New

(*Continued from page 10*)

wrench is available with the standard ½-in. square drive shank, or with any one of three optional models, including the $^{7}/_{16}$-in. hex slip-chuck, which converts the wrench into an all-purpose tool to run bolts, turn nuts, drive screws or drill. An integral power regulator, built into the tool handle, can be adjusted to the power requirements of the job. Chicago Pneumatic Tool Co.

For more information, circle 2-7 on card following page 46.



Descaling Tool

Clusters of rapidly impacting needles in the Model 1B Von Arx needle gun ass

ıtically adjust to contours of bolt heads, ₃vices and corners, and irregular surfaces. r requirements are said to be no greater ın for a paint spray gun. The tool weighs ly 3.3 lb. For special jobs, it can be con- rted into a conventional type chisel ham- ₃r. Marindus Co.

For more information, circle 2-8 on card 'lowing page 46.

ectrical Tape

otch brand electrical vinyl-plastic tape). 99 is designed for use in oil splash and mersion applications and for continuous ₂ at temperatures up to 220 deg. F. The)e can also be applied at freezing temper- ıres. It is available in 3-in. x 66-ft rolls. innesota Mining & Manufacturing Co.

For more information, circle 2-9 on card 'lowing page 46.

ar Mover

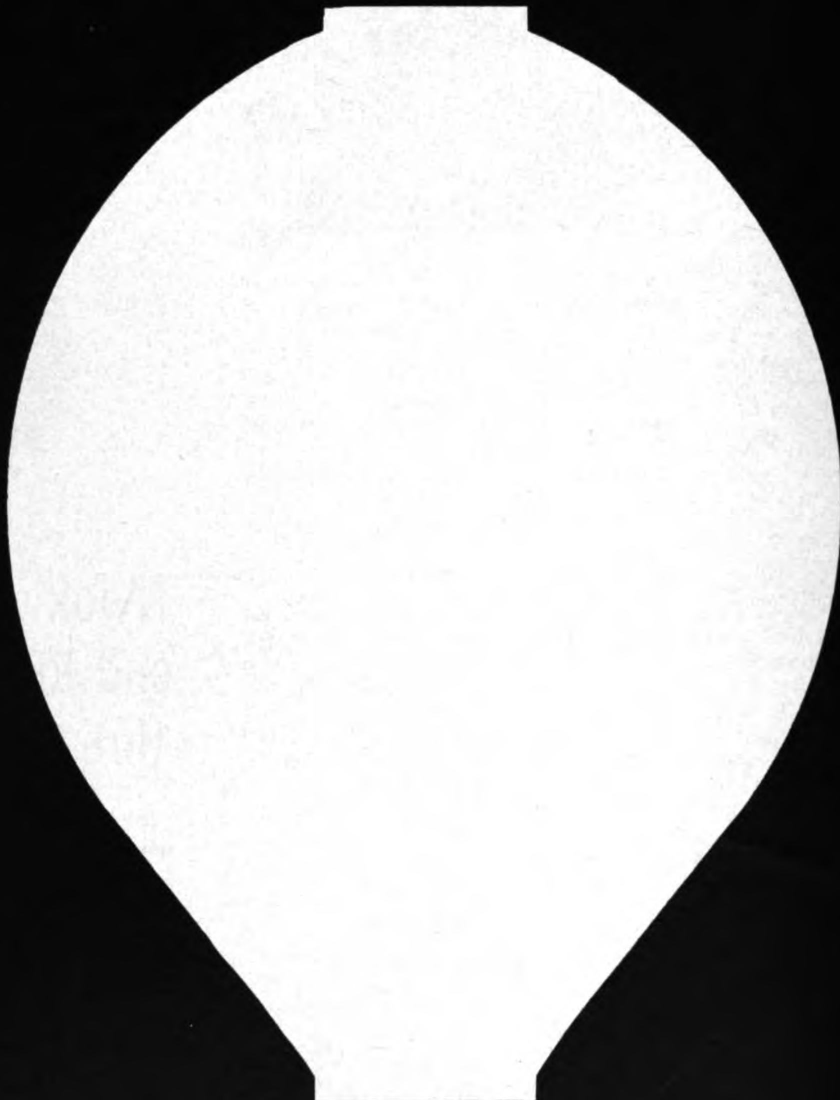
ıe Model 7 TM Trackmobile is equipped th two sets of wheels—one flanged with -in. tread diameter, heat-treated cast :el wheels set at standard gage for rail use; ₂ second, mounted parallel with the first : and equipped with 12-ply 9 x 20 pneu- ıtic tires for road use. The second set of ıeels may be raised and lowered by means hydraulic cylinders. By means of two draulic cylinders, the hydraulically con-

trolled Whiting coupler may be pushed up against the standard coupler with a force of about 40,000 lb, thereby increasing the adhesive weight on the Trackmobile wheels by an approximate equivalent amount. A Hercules 6-cylinder gasoline engine is standard. Optional are a GM, Cummins, or Hercules diesel. Whiting Corp.

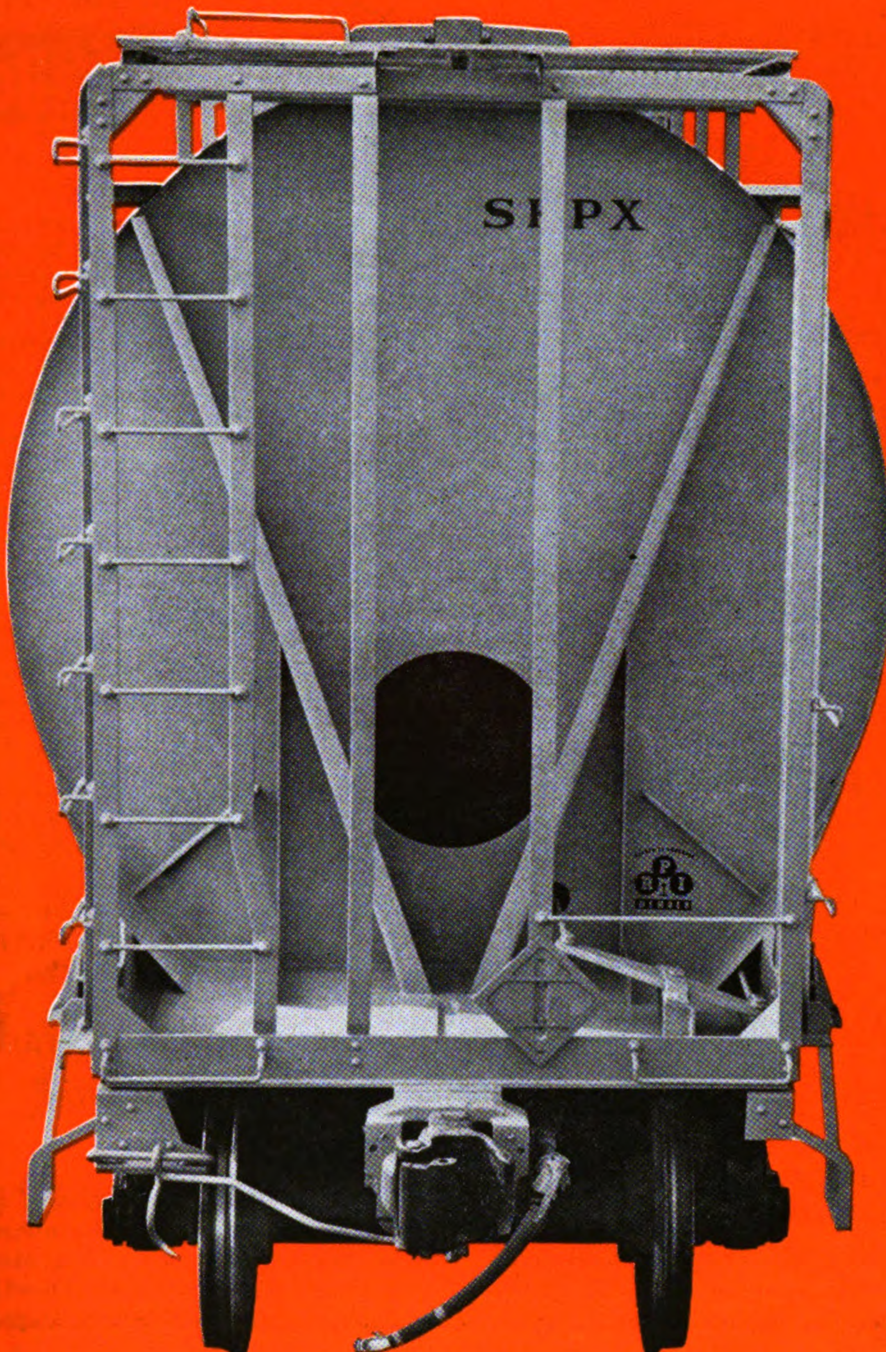
For more information, circle 2-10 on card following page 46.

Fuel Filter

All contaminants 10 microns and over are said to be removed with the FF-3347-R Spin-on filter. It is spun-on with hand pressure. By installing the GFB adapter in existing lines, singly or in parallel, the adapter becomes a permanent fixture. In the December issue, page 15, it was incorrectly stated that the neoprene gasket becomes a permanent fixture. Wix Corp.



Why is it pear-shaped?



Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following this page.)

12. POWER PLUGS AND RECEPTACLES. Catalog 50E lists seven lines of power connectors for battery charging, for quick disconnects on portable electric machinery and for welding equipment. Albert & J. M. Anderson Mfg. Co.

13. TOOLS FOR PRODUCTION AND MAINTENANCE. Catalog "Y" describes Snap-on line of industrial wrenches and mechanics tools and equipment. Snap-on Tools Corp.

14. TEMPERATURE INSTRUMENTS. Partlow condensed Catalog and Selection Chart covers line of industrial heating and refrigeration instruments in minus 30 to 1,100 deg F range to control oil, gas, steam, water, air or electrical equipment. Partlow Corp.

15. WHEEL AND AXLE TOOLING. Catalog RRC-1 describes carbide tooling system designed to cut machining and tool costs for railroad wheel and axle reconditioning. Wesson Corp.

16. WOOD PRESERVATIVES. "Design/Build with Pressure Treated Wood" describes uses and special characteristics of wood pressure-treated with creosote, water-borne salt, fire-protective specialty and gas-borne preservatives. Koppers Co.

17. FILTER ASSEMBLIES. Bendix 3500 series low-pressure filter assemblies for use in diesel-fuel, lubricating-oil, and other fluid systems requiring high flow, low-pressure drop, described in Bulletin BFD-301. Bendix Corp.

18. FLOOR PLATE. Data on sizes, allowable loads, and applications of A. W. Super Diamond floor plate given in booklet No. SD 628. Alan Wood Steel Co.

Advertisers Index

BUILT IN 1944

IN 1961

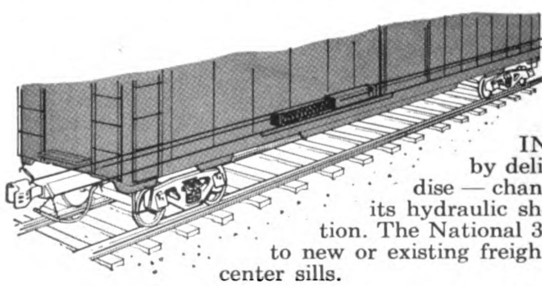
ONE OF THE FINEST Cushioned Cargo Cars IN SERVICE

This CB&Q boxcar is typical of a "new generation" of veteran rai cars. After 18 years in service, in 1961 the Burlington brought the ca to the latest Gliding Ride standards by installing National 3C* Gl Sills. Now number 34953 has taken its place alongside the most mo cars in existence . . . has taken a new lease on revenue-producing li proven by over 15 months in service with virtually no lading dam

This actual case history is important to all railroads and all car o ators for this reason: National 3C Gliding Sill points the way to redu crippling damage claims . . . makes bad-order cars from end-to impacts a thing of the past.

Because the 3C hydraulic unit responds *only* to dynamic force operates *only* when shock protection is needed. Rubber draft gears, wi operate in *buff* or *pull*, provide all necessary protection for the sill du train operation. Thus the National 3C provides optimum cushion protection to lading, car structure, trucks and journals.

Change Ride to Glide with the National 3C Gliding Sill in all y new or existing cars having AAR standard center sills. It will help banish the twin bugaboos of damage claims and damaged cars.



NATIONAL 3C GL ING SILL increases effici by delivering damage-free merch dise — changes Riding to Gliding thro its hydraulic shock absorbing-cushioning tion. The National 3C Gliding Sill can be app to new or existing freight cars having AAR stand center sills.

***Cushioned Cargo Car that Cuts Cargo Clai**

International Division
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COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES • ROLLER BEA
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A-8021A

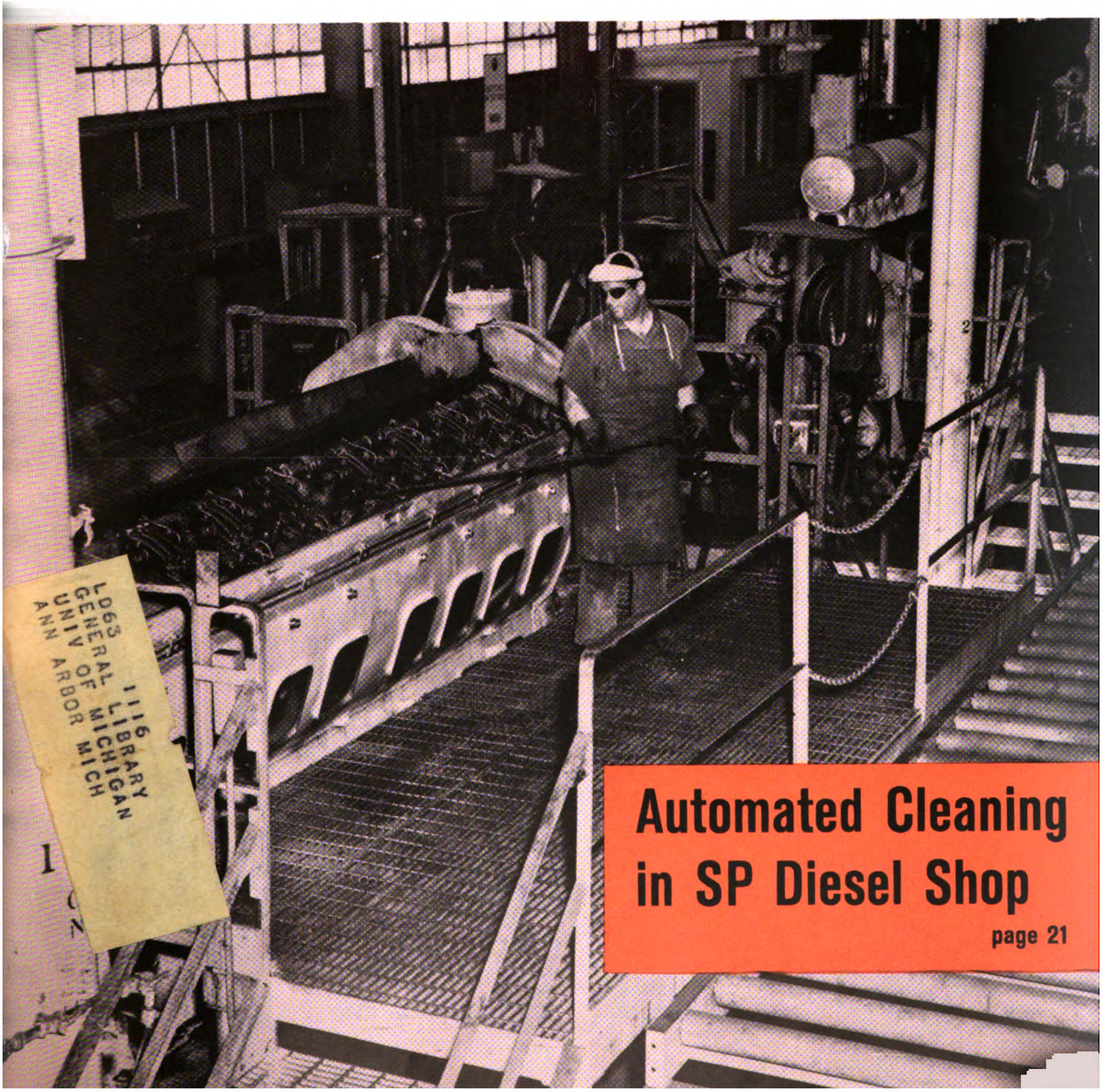
ILWAY ocomotives nd Cars

MARCH 1963

P-S Delivering 92 Alloy-Steel Rapid-Transit Cars to Boston

page 38

A Simmons-Boardman TIME SAVER Publication

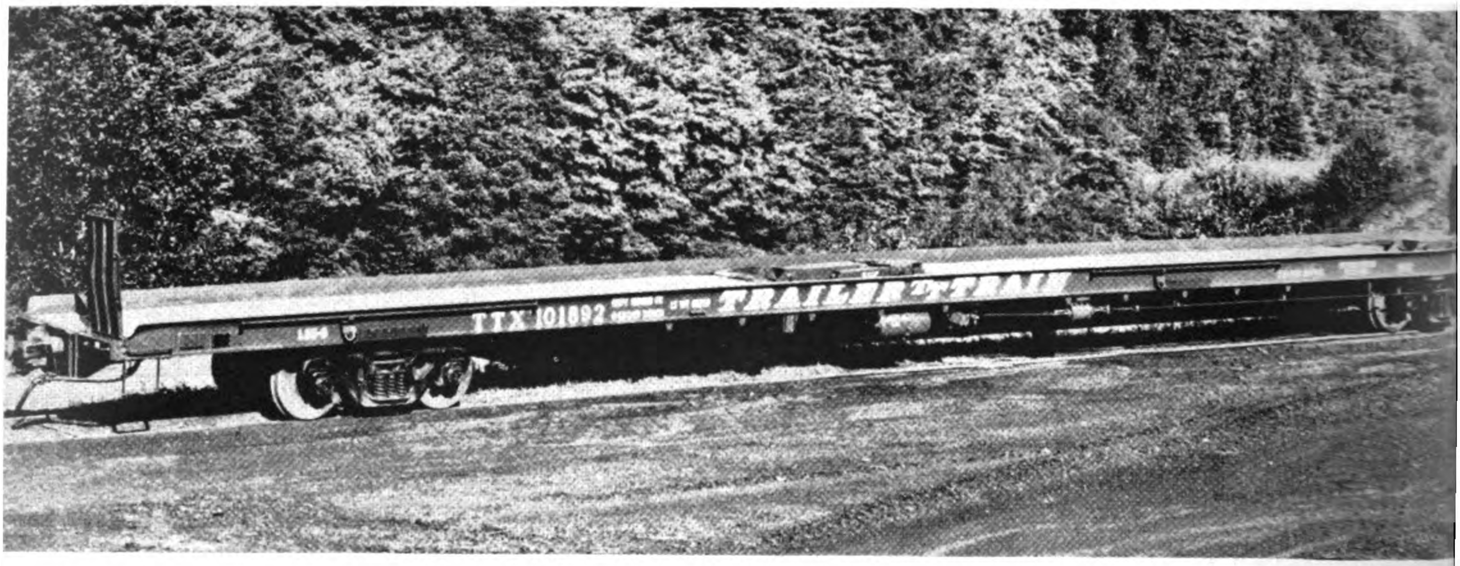


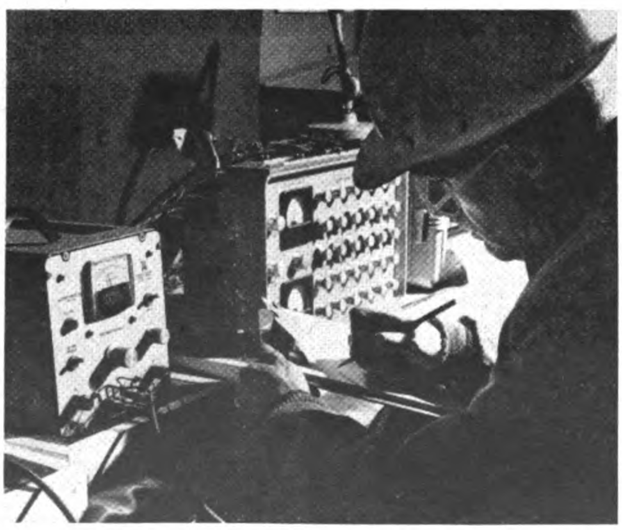
Automated Cleaning in SP Diesel Shop

page 21

Workhorse of th
piggyback fleet

RACK-EQUIPPED TTX cars carry new automobiles to market on fast-freight schedules. King-size flat cars like these, many built by Bethlehem, are rapidly bringing new-car traffic back to rails.





IN-SERVICE TESTING is a continuous part of Bethlehem's freightcar development program. Here, special instruments in caboose enable Bethlehem engineer to study dynamic stresses in adjacent piggyback car in normal freight-train service.

for Strength
. . . Economy
. . Versatility

This new 85-ft car of standard deck height reflects Bethlehem progressive engineering from end sill to end sill. Constitut the backbone of the ever-expanding Trailer Train piggyb fleet, this design is suitable for transporting highway trail and can easily be modified to carry containers, or equipp with auto racks.

The basic design, adopted over four years ago, has be refined in each succeeding order with the result that toda car is stronger, better equipped, more reliable, and of un celled quality. These engineering improvements stem fr service experience, shop-practice experience, and advan designing and testing knowledge.

All new Bethlehem concepts in engineering and equ ment are thoroughly proved out through complete p formance and endurance tests on a prototype car. Bethle pioneered in the design and construction of piggyback cars, building the original cars for transporting two trai per car over seven years ago. These cars are part of the Tr Train fleet, to which Bethlehem has added large num of even more durable and modern quality-built cars.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

AILWAY

.ocomotives

ınd Cars

America's Oldest Trade Paper
March, 1963—Vol. 137, No. 3

ΛE SAVING IDEAS FOR MARCH

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Report For March

LMOA Schedules Diesel Maintenance Reports

The Locomotive Maintenance Officers Association will again present its annual meeting committee reports before local and regional railroad clubs.

According to LMOA president, C. A. Love, chief mechanical officer, Louisville & Nashville, the 1963 pre-convention presentations at regular meetings of these clubs have "economy-minded" objectives. They give many mechanical department men an opportunity to obtain helpful information on motive-power maintenance problems that they would not get otherwise. Mr. Love estimates that approximately 1,000 men will attend the local and regional meetings and only 10% of this attendance will be privileged to attend the October 14-16 annual meeting at Chicago. He urges the attendance of every possible local diesel maintenance officer at these meetings because costly, off-line travel is being discouraged.

Presentations at the local and regional clubs also are helpful to the LMOA committees who get added expert assistance that improves the reports before they are delivered and discussed at the October meeting. The LMOA pre-convention schedule follows:

CHICAGO RAILROAD DIESEL CLUB—*April 9, Hotel Hamilton, Chicago.* Subject: Fuel and Lube Oil Requirements for Higher Horsepower Locomotives. Chairman: C. A. Wilson, general supervisor diesel engines, Atchison, Topeka & Santa Fe.

SOUTHWESTERN RAILWAY DIESEL CLUB—*April 18, Hotel Texas State, Houston, Tex.* Subject: Mechanical Maintenance—Higher Horsepower Locomotives. Chairman: T. W. Bellhouse, superintendent mechanical department, St. Louis-Southwestern.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB—*April 18, Mayflower Hotel, Jacksonville, Fla.* Subject: Mechanical Department Responsibility for Locomotive Maintenance Cost Control. Chairman: W. F. Dadd, general superintendent motive power—system, Baltimore & Ohio.

MILE HIGH RAILWAY CLUB — *April 29, Pomponio's Restaurant, Denver, Colo.* Subject: Facilities Required for Higher Horsepower Locomotives. Chairman: J. D. Schroeder, assistant general superintendent motive power, Chicago, Burlington & Quincy.

ST. LOUIS RAILROAD DIESEL CLUB—*May 6, Louis IX, Union Station, St. Louis, Mo.* Subject: Effects of Higher Horsepower on Electrical Equipment. Chairman: J. R. Mitchell, assistant electrical engineer-equipment, Illinois Central.

LOUISVILLE RAILROAD CLUB — *May 8, American Legion Post, Louisville, Ky.* Subject: Organization and Responsibility of Locomotive and Stores Departments. Chairman: G. R. Harrod, process engineer, Southern.

MID-SOUTH AIR BRAKE AND DIESEL CLUB —*May 22, Hotel Claridge, Memphis, Tenn.* Subject: Comparative Analysis of Higher Horsepower Engine Maintenance. Chairman: G. W. Niemeyer, mechanical superintendent, Missouri Pacific.

New Brake Equipment Authorized for Test

Approval has been granted by the AAR Mechanical Division for New York Air Brake and Westinghouse each to offer 2,000 sets of the B-1 quick service valve and No. 8 vent valves for application to cars in interchange. Both can be used with standard AB equipment. Tests on air-brake manufacturer's test racks, simulating operation of a train of 75 cars 100-ft in length, show the valves provide faster transmission of service brake applications and guarantee transmission of emergenc brake applications through a section or cars on which the brakes are cut out.

Railway Progress Exhibit Scheduled for October

The American Railway Progress Exposition, to be held in Chicago October 9 through 16, will feature exhibits from approximately 300 railroad supply companies displaying $40,000,000 worth of the latest railroad equipment. Exhibits, sponsored jointly by railroad suppliers and the railroads, will be held in Chicago's McCormick Place and at nearby Illinois Central 31st Street Yard.

Among the organizations which will hold their annual meetings during this time are the AAR Mechanical Division and the Coordinated Associations—Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers.

Late reports indicated that 224 railway supply companies had contracted for exhibit space—180 in the convention hall and 44 at the track exhibit. Railway supply organizations have reserved only the north and middle sections of the main exhibit floor, but additional space for additional exhibits will be available on the bottom floor of McCormick Place.

During the exposition, 20 railroad, supply, and shipper organizations will meet in Chicago. Over 30,000 railroad and allied industry officers are expected to attend the more than 100 separate meetings scheduled during the exposition. In addition to the mechanical organizations, there will be annual meetings of all divisions of the Association of American Railroads, of the Railway Progress Institute, and of the National Association of Shippers Advisory Boards. The AAR groups will meet during first week; Coordinated groups, during second week.

A special luncheon will be
day, October 10. Following
plans are being made for an A
at McCormick Place aimed spec
publicizing the railroad industry.
way Progress Institute will hold
annual meeting and dinner on We
October 9, at the Conrad Hilton
Supplier organizations which
bined to present the exhibits are
tion of Track and Structure Sup
National Railway Appliances A
the Railway Supply Association
Railway Signal and Communicat
pliers Association.

Chairman of the combined rai
pliers exhibit is Joseph P. Klei
cago, manager of track work
American Brake Shoe Co. Curtis D
vice president—operations and
nance, AAR, is assisting the va
road groups in program arrange

Mass Transit Is Topic For April RR Conference

The fifth Joint Railroad Confere
sored by the American Society of
cal Engineers and the Institute o
and Electronic Engineers, will be
Atlanta, Ga., April 25 and 26. Mass t
will be stressed in many of the discus
All sessions for the two-day meeting a
be held at the Atlanta Biltmore. Ge
chairman for the meeting is J. W. Tr
assistant vice president of Southern
Telephone & Bell Telegraph Co.; co-c
man, F. P. DeKoning of J. J. Finniga

Luncheons are scheduled for both
At the April 25 luncheon, the speake
be D. W. Brosnan, president of the S
ern. Speaker for the second lunche
not yet been announced. There will be
technical sessions as follows:

THURSDAY, APRIL 25

A Family of Mass Transit Systems—
S. Jones, Stanford Research Institute.

New and Ultra Modern Concept of
Transit Design—Richard R. Lich, as
vice president, St. Louis Car Co.

The Magnetic Road: A New Fo
Transport—James R. Powell, Brook
National Laboratories.

Environmental Testing for Tran
plications—W. J. Simpson, General
tric Co.

A Space Age Drive for Rapid T
Cars—E. C. Appleby, Westinghouse
tric Corp.

Investigation of Journal Finish on T
tion Motor Support Bearings—R. W. A
ery, P. H. Baker, and J. K. Wentz, Loco
tive and Car Equipment Dept., Gen
Electric Co.

FRIDAY, APRIL 26

Performance Tests of Long-Travel Cu
ion Underframes—W. Van Der Sluys, W
Manos, and M. G. Marshall, Pullm
Standard.

The Electrical System on Krauss-M
Diesel-Hydraulic Locomotives —
Schmidt, assistant director research, De
& Rio Grande Western.

Some Significant Diesel-Electric Loco
tive Repair Cost Trends—W. H. Mim
perintendent motive power and equip
and W. H. Leavengood, engineer m

(Continued on page 53)

Orders and Inquiries for New Equipment

Placed Since Closing of February Issue

Locomotive Orders

ERIE-LACKAWANNA.—*Alco:* 15 2,400-hp *Century* 424 diesel-electric locomotives. Cost, approximately $3,000,000. Delivery expected to begin shortly.

GREAT NORTHERN.—*Electro-Motive:* 17 GP-30 diesel-electric locomotives.

LEHIGH & HUDSON RIVER.—*Alco:* 2 2,000-hp Century 420 diesel-electric units. For second-quarter 1963 delivery.

Passenger Car Orders

CHICAGO & NORTHWESTERN.—*Pullman-Standard:* 10 double-deck commuter cars for push-pull suburban service. Cost, $1,600,000. For September-October delivery.

Freight Car Orders

ATLANTIC COAST LINE.—*ACF:* 100 70-ton, cushion-underframe, double-door box cars equipped with lading-protection devices. Cost, approx. $1,750,000. Delivery to begin in July.

CHESAPEAKE & OHIO.—*Pullman-Standard:* 400 50-ft, 70-ton insulated box cars equipped with cushion underframes. Delivery to begin in June.

CHICAGO & EASTERN ILLINOIS.—*Morrison-International:* 10 steel caboose cars.

GREAT NORTHERN.—*ACF:* 200 50½-ft, 70 ton, all-steel box cars. For delivery third quarter 1963. *General American:* 200 all-steel Airslide covered hopper cars. For July delivery.

ILLINOIS CENTRAL.—*General American:* 50 70-ton Airslide covered hopper cars. Cost, $675,000. For delivery second quarter 1963. *Pullman-Standard:* 100 100-ton covered hoppers. Cost, $1,400,000. Delivery to be completed this month.

LONG ISLAND.—*Morrison-International:* 9 30-ft all-steel cabooses with bay windows. Cost, $125,000. Two delivered.

LOUISVILLE & NASHVILLE.—*Pullman-Standard:* 100 50-ft, 4,000-cu-ft-capacity trough-hatch covered hoppers (RL&C, Jan. 1963, p 30) to be used for hauling grain and other bulk commodities. First 50 cars to be delivered about March 15.

MILWAUKEE.—*Pullman-Standard:* 50 covered hopper cars. For delivery this month. *General American:* 50 box cars. For July delivery.

NORFOLK & WESTERN.—*Pullman-Standard:* 300 70-ton, cushion-underframe, roller-bearing box cars. For delivery beginning in April. Cost, approx. $4,650,000. 100 cars will have sliding aluminum doors; 200, 8-ft doors. All will be fitted with lading-protection devices. *Company shops:* 20 bulkhead flat cars; 6 covered steel gondola cars; 1,000 85-ton roller-bearing hopper cars. Production to begin on latter after completion of earlier order (RL&C, Dec. 1962, p 7). Hoppers scheduled for completion in August.

NORTHERN PACIFIC.—*ACF:* 25 70-ton covered hopper cars. Approx. cost, $278,000. For delivery this month. *Pacific Car & Fdry.:* 25 refrigerator cars. Approx. cost, $760,000. For June or July delivery.

PACIFIC FRUIT EXPRESS.—*Pacific Car & Fdry.:* 500 57-ft, 70-ton multi-purpose mechanical refrigerator cars with 8-ft doors, cushion underframes, load dividers and roller bearings. These cars in addition to 500, order for which was announced in December issue, p 7. Deliveries to be completed by October.

UNION TANK CAR.—*Company shops:* 82 tank cars. Shipped during January.

WESTERN PACIFIC.—*Thrall Car:* 18 100-ton, 4,000-cu ft capacity Tenelon stainless-steel covered hopper cars. Purchased. *General American:* 10 70-ton, 2,600-cu-ft-capacity Airslide covered hopper cars equipped with pneumatic loaders. For mid-year delivery.

Notes and Inquiries

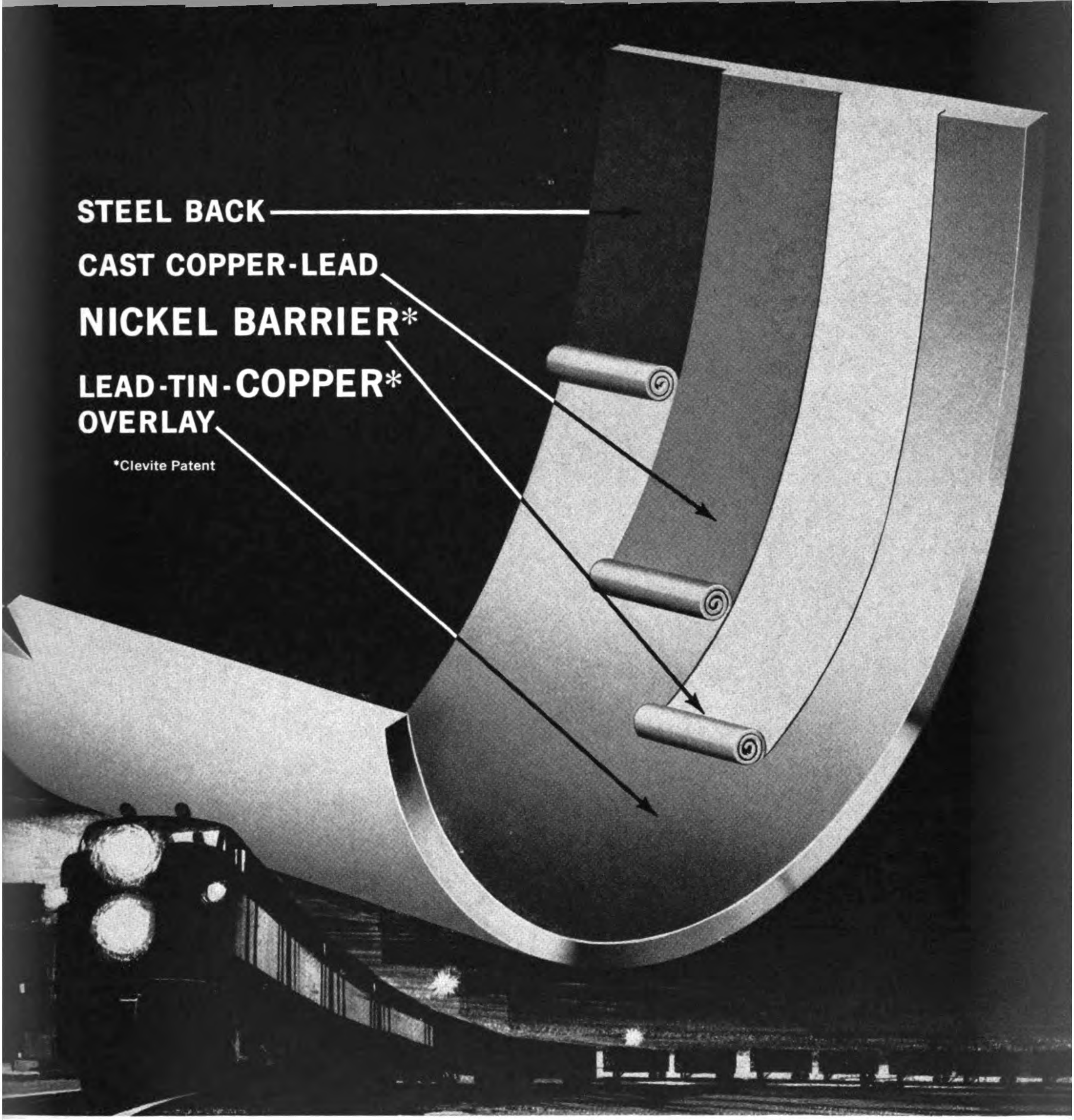
Bangor & Aroostook will purchase 125 50-ft box cars equipped with cushioning devices at a cost of approximately $1,725,000. Acquisition authorized after management reported that 60 similar cars purchased from Pullman-Standard in 1962 had "all but wiped out any transit damage to the loads in the cars" used to haul paper from northern Maine mills.

Chicago & North Western will spend $10 million during 1963 to upgrade 5,600 freight cars at its Clinton, Iowa, shops. To be rebuilt or repaired are 3,315 box cars, 926 gondolas, 500 hoppers, 200 covered hoppers, 300 flat cars, 100 ore cars, 100 cabooses, and more than 100 miscellaneous cars, including work equipment.

Long Island plans to modernize 26 passenger cars this year. The more than 200 cars to be given program repair include some of those modernized early in the rehabilitation program that got under way in 1954. Various types of ceiling fixtures and new non-glare lamp bulbs are being tested. All cars with plain bearings are now being equipped with lubricator pads, replacing waste packing. Thirty to 35 cars each month get the pads developed by LI mechanical engineers and the manufacturers specially for passenger cars.

The *New Haven's* lease to acquire new air-conditioned commuter cars, for which New York State voters in 1961 authorized the State to guarantee up to $100 million of Port Authority bonds (RL&C, April 1961, p 8; May 61, p 36) has been cancelled. The Port Authority said it was cancelling out because the Federal District Court in New Haven "so severely qualified its approval" of the bankrupt road's lease with them that it made the entire contract unacceptable. The Court, on January 31, reserved to itself the right to modify the lease at any time and also deleted provisions in the agreement between the Port Authority and the NH banning cutbacks in commuter service.

Western Pacific directors have authorized $1,570,000 for 1963 acquisition of new freight cars.



EVITE: New source for EMD bearing replacements

ut new. Cleveland Graphite ze, world's largest maker of engine bearings, now offers tented heavy-duty bearing for cements of EMD main and earings.

type bearing is *old*, produced any years at the rate of four n a month. Yet, it's *new*, the time this bearing has been ble for use in EMD engines.

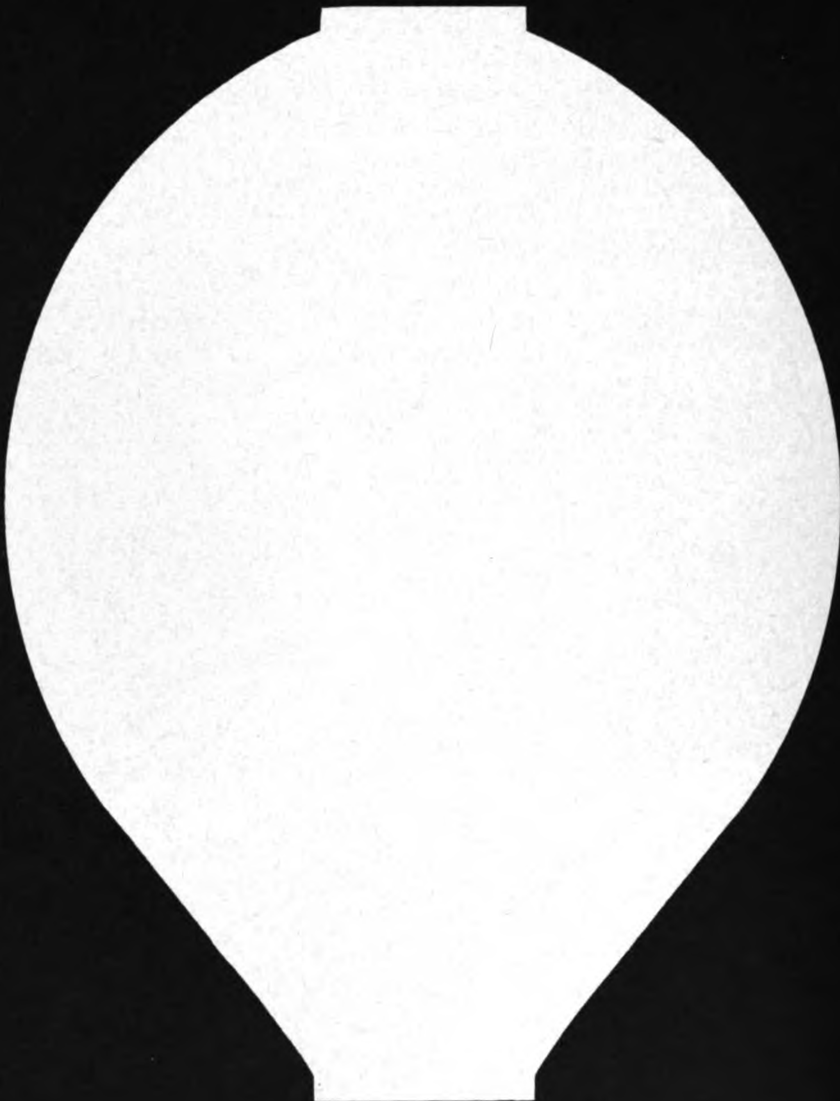
ickel barrier stops tin migra- rom the overlay. It increases ng life by enabling overlay to withstand corrosion at all times. The abrasion resistance and surface action of the overlay maintain new bearing quality at all times.

Copper-Lead-Tin overlay: Fatigue life of the overlay is increased substantially by the addition of 3% copper in the precision electroplated overlay.

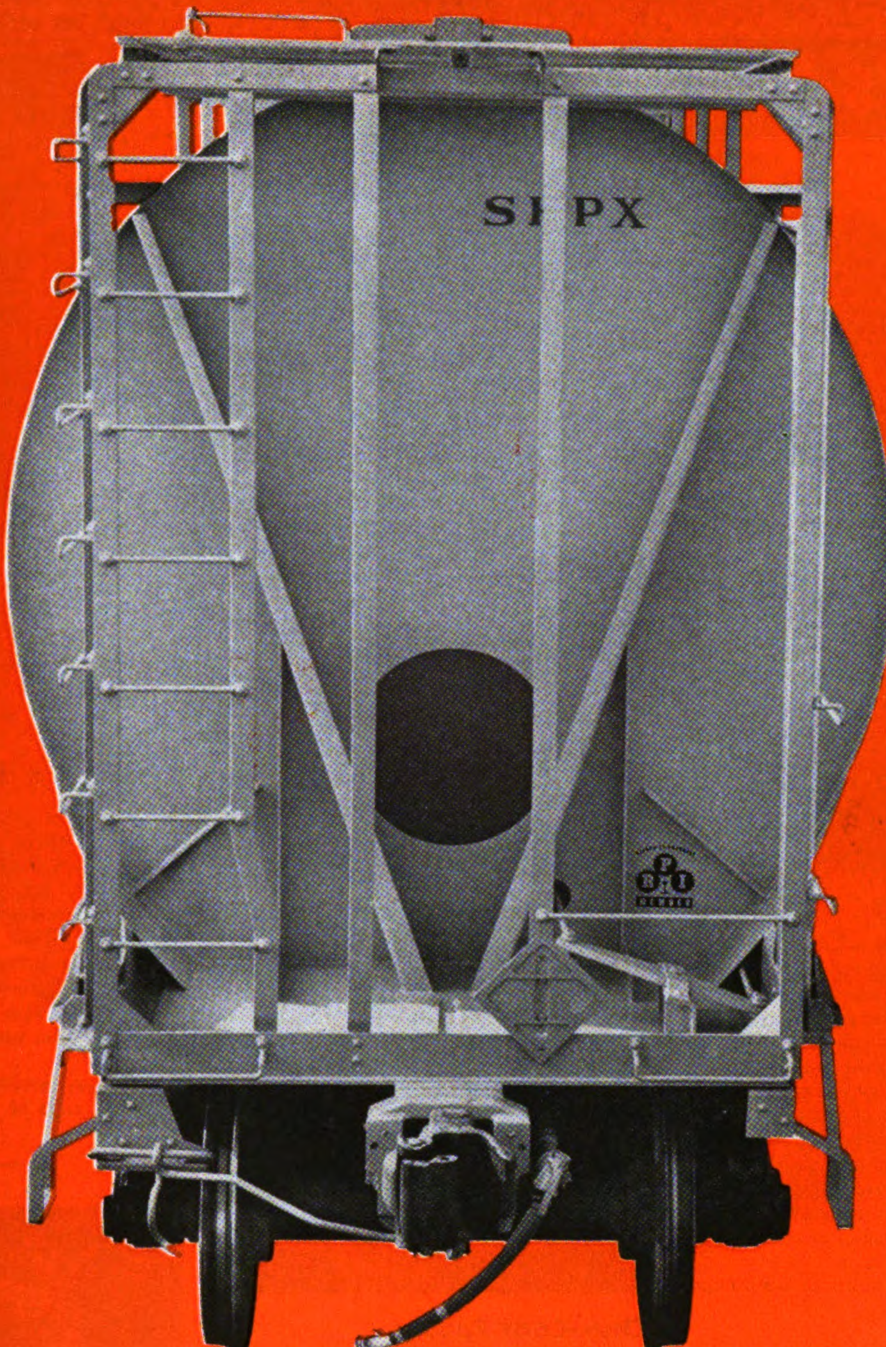
PRI MEMBER

CLEVITE

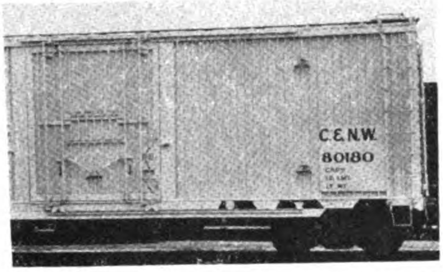
Improved—yet the cost is less! Only Cleveland Graphite Bronze can offer this improved four layer bearing. Take full advantage of this product that combines product improvement with cost reduction. For complete information, contact *Cleveland Graphite Bronze, division of Clevite Corporation, 17000 St. Clair Avenue, Cleveland 10, Ohio. In Canada: Clevite Ltd., 1177 Talbot, St. Thomas, Ontario.* Also manufacturers and distributors of the Clevite Journal Bearing Cartridge.

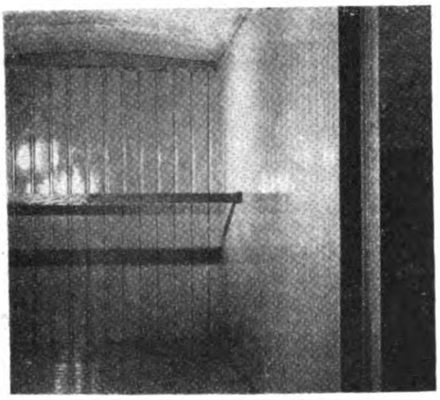


Why is it pear-shaped?



What's New in Equipment





Nailable Siding

Nailable steel sides in combination with Tri-Rib interior steel end lining and nailable steel floors are used in the Transco all-steel freight car. The sides of the car consist of structural steel modular columns welded on 6-in. centers. The built-in column system gives a smooth interior and eliminates regular side-post construction and wood lining. Interior car widths may be obtained up to 9 ft 8½ in. and cubic capacity increased 10%. The superstructure is said to weigh less than ordinary types presently available, and it can be readily applied to existing cars. Transportation Specialties Co.

For more information, circle 3-1 on card following page 54.

Car Flooring

Glam-Deck edge grain flooring for freight and baggage cars, is said to have excellent nailability for blocking and bracing of lading. It is industrial grade, knot-free Douglas Fir, treated with water repellant preservative and laminated into solid 15-in. panels. It is available in six precision trimmed thicknesses from $1\frac{1}{16}$- to $2\frac{3}{8}$-in., and three standard edge types—straight, ship-lap or tongue and groove. Standard lengths are from 6- to 20-ft. Special lengths, thicknesses, widths and edge patterns can be furnished. The material can be shipped precut to meet exact specifications. Ajax-Consolidated Co.

For more information, circle 3-2 on card following page 54.

Surface Conditioner

Steel-Treet, a product of Marsh Steel & Aluminum Co., converts rust on hot-rolled steel to a dark blue iron phosphate, producing a surface similar to that of freshly rolled steel. The chemical, which inhibits rusting for approximately two months outdoors and a year indoors, also acts as a bonding agent for improved paint adherence. No sandblasting or wire brushing is needed. Coverage is 800 to 1,600 sq ft, depending upon method of application. Carter-Waters Corp. (Distributor).

For more information, circle 3-3 on card following page 54.

One-Coat Epoxy

Freight Liner 475 epoxy for covered hopper car interiors provides 4 to 5 mils thickness with a one-coat application. No primer is needed when applied directly to sandblasted steel. The coating is reported to meet Food and Drug specifications. It is said to be resistant to methyl bromide and other fumigants and chemicals used in food service cars. It is also resistant to moisture and abrasion, and has good load release. Archer-Daniels-Midland Co.

For more information, circle 3-4 on card following page 54.

Agitated Tanks

A quadruple flow pattern features a new line of Turbulator propeller-actuated tanks. The machines automatically alternate among the different flow patterns during each cleaning cycle, and the cycles can be varied to obtain maximum cleaning in a

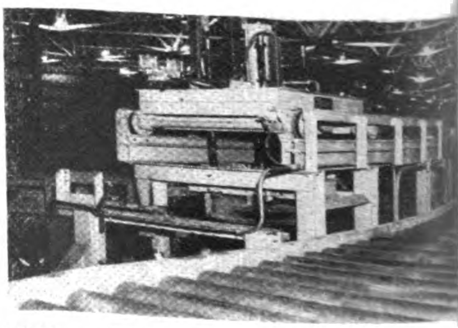
minimum of time for each type of clea[ning] requirement. Turco Products, Inc.

For more information, circle 3-5 on ca[rd] following page 54.

Air Intake 'Dipstick'

The degree of cleanliness of air entering [the] engine air intake manifold can be check[ed] with the Farr Dust Sight which consists o[f a] white metal tab placed directly in the [air] stream and viewed through a shatterpro[of] "window." When dust accumulates on [the] tab, preventive steps should be taken to pr[e]vent contamination of the air system. T[he] sampling tab also shows leaks from fau[lty] gaskets, joints, connections or hoses. Fa[rr] Co.

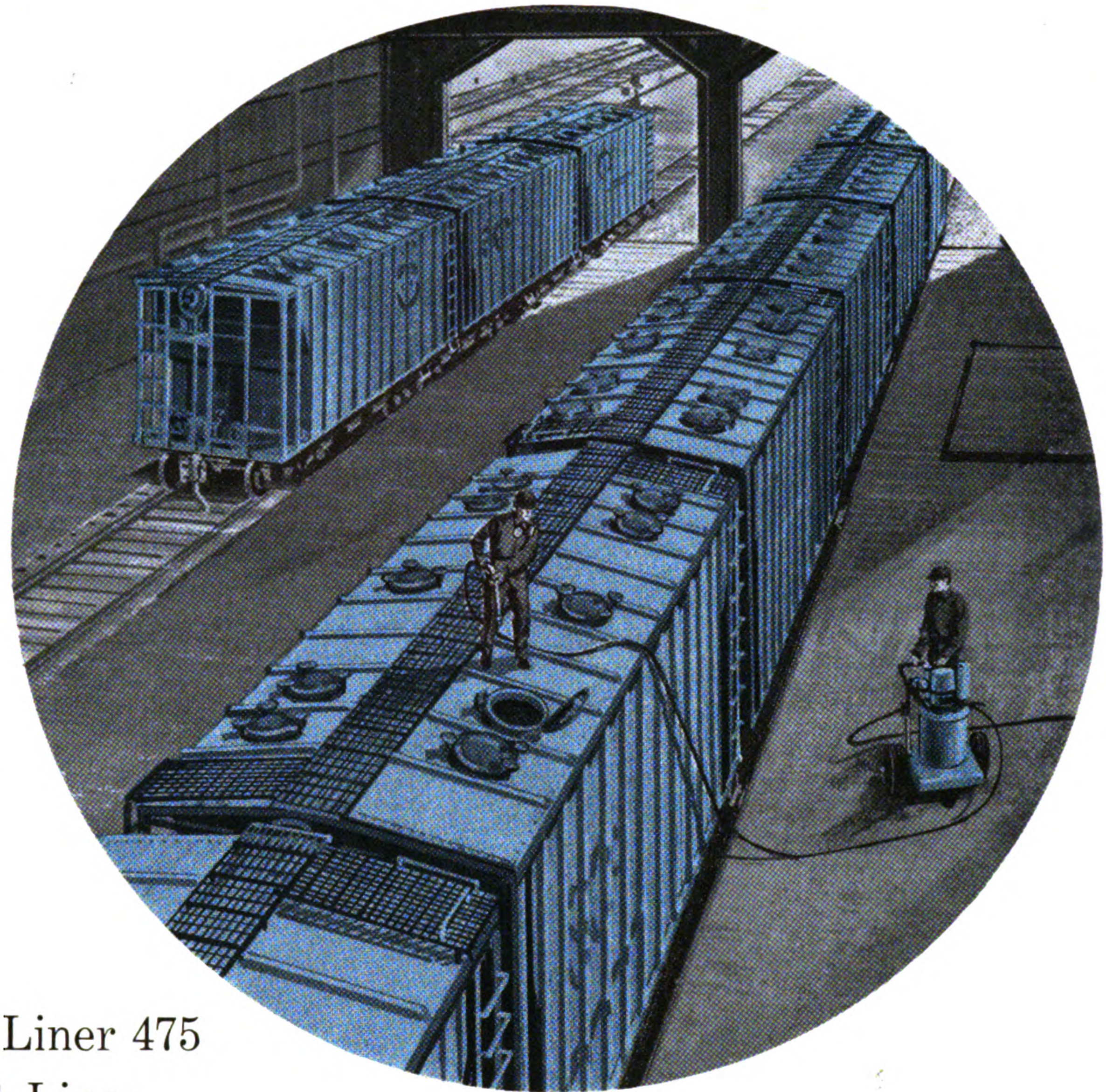
For more information, circle 3-6 on c[ard] following page 54.

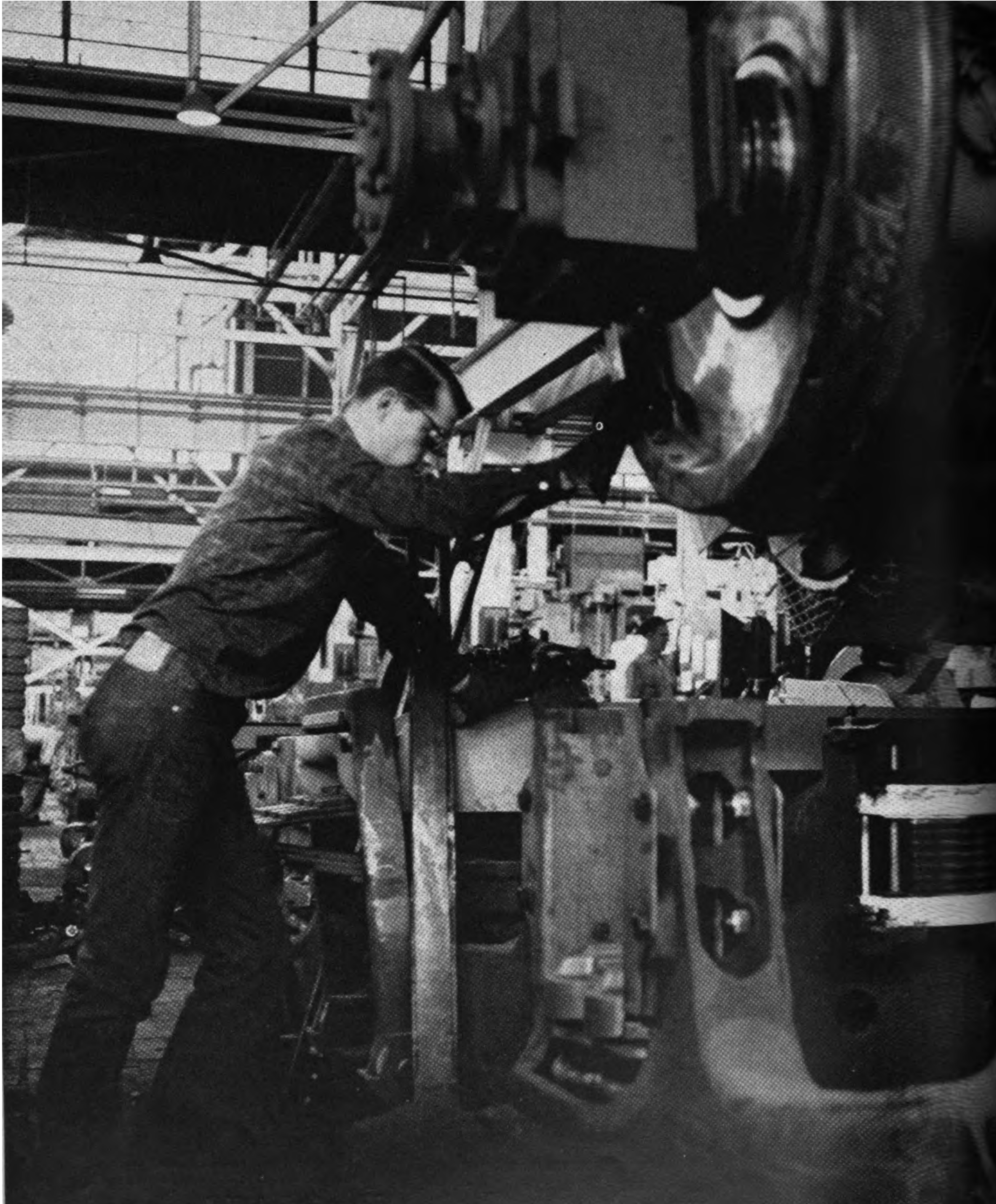


Wheel Conveyors

The 3,000-ft automatic conveyor system in[-]stalled in the Griffin Wheel plant at Bense[n]ville, Ill., makes possible fast handling o[f] foundry molds and of the 690-lb wheel[s]. The 2,500-sq ft wheel-storage system con[-]tains 10 live storage lines. After automat[ic] Wheelabrator cleaning a Magnaglo inspec[-]tion set-up between the hot-wheel line an[d] finishing may determine that any individu[al] wheel requires processing through one, tw[o] or three finishing lines. An automat[ic] stacker forms stacks of three wheels o[n] transverse roller beds in a jogging slat con[-]veyor which crosses the feed end of the li[ne]

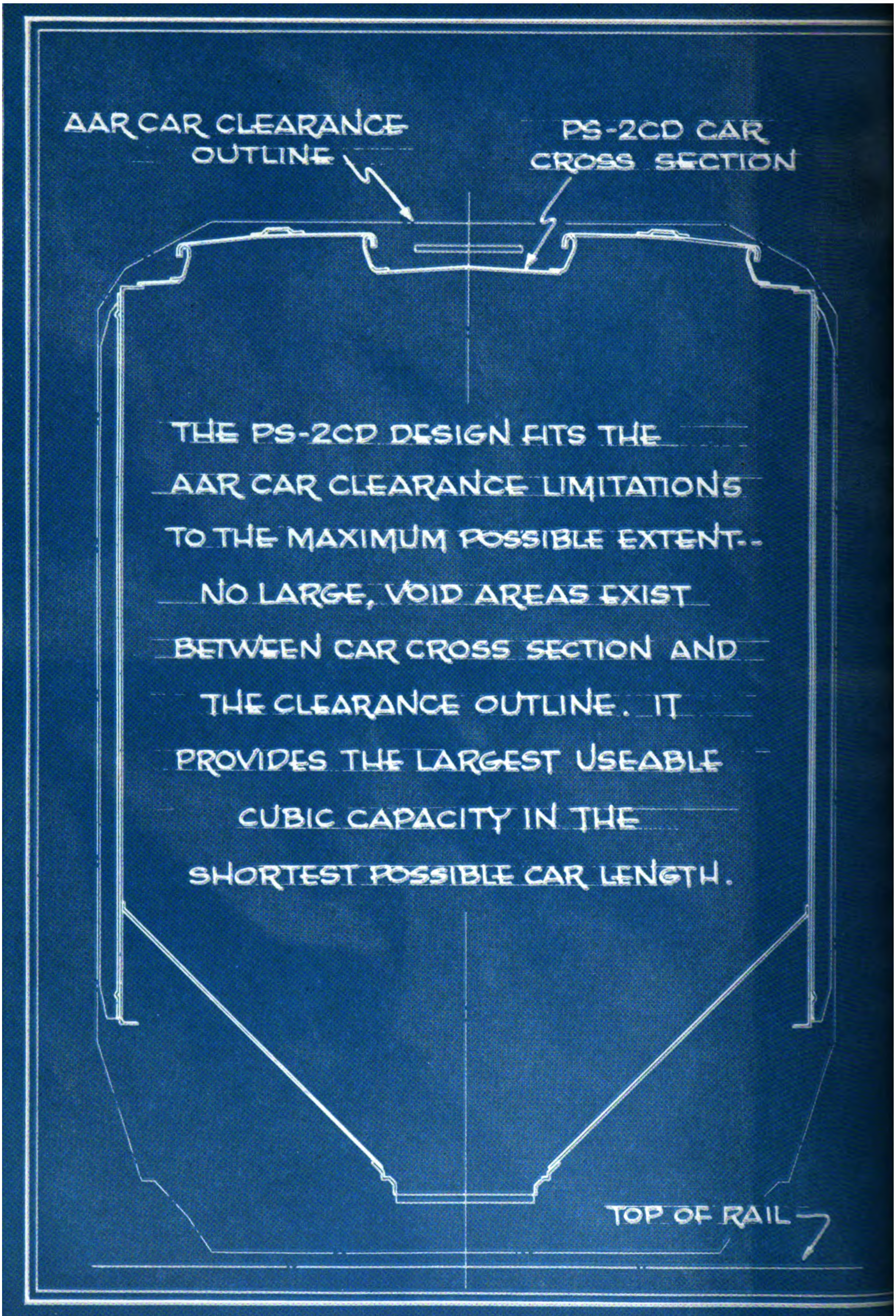
(Continued on page 16)





Electro-Motive Parts MAKE the Diesel Locomotive!

On the production line at LaGrange hundreds of individual parts are manufactured, assembled and brought together to build a masterpiece of motive power, the Revolutionary GP-30. The importance of each part is emphasized by the fact that the GP-30 is only as good as its components. Actual production line photo shows one of these parts, the traction motor rubber nose support, already installed in (up-side-down) truck frame. The traction motor and wheel assembly is being lowered into place.


AAR CAR CLEARANCE OUTLINE
PS-2CD CAR CROSS SECTION
THE PS-2CD DESIGN FITS THE AAR CAR CLEARANCE LIMITATIONS TO THE MAXIMUM POSSIBLE EXTENT-- NO LARGE, VOID AREAS EXIST BETWEEN CAR CROSS SECTION AND THE CLEARANCE OUTLINE. IT PROVIDES THE LARGEST USEABLE CUBIC CAPACITY IN THE SHORTEST POSSIBLE CAR LENGTH.
TOP OF RAIL

**Patents applied for

alternate trough-type hatch** designed for fast, un-rrupted commodity loading is featured on the PS-2CD strated above.

IE PS-2CD'S SHORT ENGTH, HIGH CAPACITY, ENTER DISCHARGE ND BROAD SELECTION F ALTERNATE FEATURES JPPLIES NEW ERSATILITY IN THE FIELD F BULK COMMODITY RANSPORTATION.

ONTACT ULLMAN-STANDARD OR ADDITIONAL DETAILS N HOW THE PS-2CD AN FILL YOUR NEEDS.

THE NEW PS-2CD* COVERED HOPPER CAR

One basic car of the right shape with a broad selection of sizes and alternates to meet the needs of both railroads and shippers.

What is the right shape for a covered hopper car? It's the shape that permits maximum cubic load capacity in a minimum car length.

With the Pullman-Standard PS-2CD this is accomplished by making maximum use of AAR car clearance limitations. It's the square peg in a square hole idea. In this way maximum cubic capacity (4000 feet in the basic PS-2CD) can be loaded with room to spare in a standard, short car length of 49′-7″ over pulling face of couplers. For the shipper or receiver this means PS-2CDs will fit existing loading and unloading facilities, and more cars can be spotted in a limited space. For the railroad it means greater car utilization, greater traffic potential and a car of standard design and construction that promises low maintenance costs. This same short 49′-7″ length is available from Pullman-Standard in both 70-ton and 100-ton versions of the basic PS-2CD.

A broad selection of sizes and alternates permits the basic PS-2CD design to be adapted to specifically meet the varying requirements of a broad range of shippers while providing proved economies for the railroad owners.

BASIC CAR FEATURES AND TYPICAL ALTERNATES:

Unloading Arrangements . . . basic car has gravity-unloading sliding gates. Pneumatic unloading or a combination of gravity and pneumatic are also available. All unloading arrangements adapt to center discharge design. A patented P-S Air-X device for fluidizing hard-to-handle bulk commodities can be included with any discharge arrangement.

Hatches . . . basic car has the standard 30″ diameter P-S hatch. Also offered are smaller diameter hatches with screw-down covers for extra sanitary protection, and the new full car length, trough-type hatch.

Sizes . . . basic car is a three hopper design with 4000 cubic foot capacity. However, both larger and smaller capacities are available.

Construction . . . basic design is of open hearth steel, including standard center sill construction. Stainless steel or aluminum designs are available as alternates. An alternate design which eliminates the standard center sill can also be obtained.

PULLMAN-STANDARD

A DIVISION OF PULLMAN INCORPORATED
200 S. MICHIGAN AVENUE • CHICAGO 4, ILLINOIS
BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO
J. C. FENNELLY CO., REPRESENTATIVE

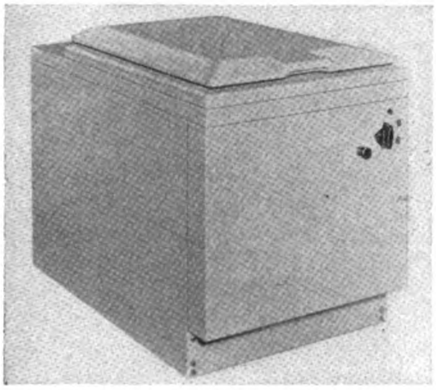
*Trademark of Pullman Incorporated

What's New

(Continued from page 10)

storage lines. The conveyor is synchronized with a series of push-off transfers to load each line in sequence. After loading, command of each storage line switches to a pushbutton destacker in the finishing department. The destacker delivers wheels individually on call. Logan Co.

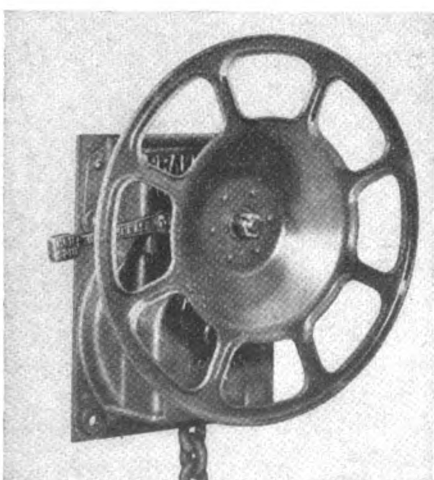
For more information, circle 3-7 on card following page 54.



Waterless Closet

Destroilet is an LP gas incinerating disposal toilet for diesel locomotives, cabooses, work cars or other installations where water and sewage facilities are not available. The unit requires a 12, 30-40, 60-80 d-c or 115 volt a-c connection. It is said to be sanitary and odorless. No chemicals or catalysts are needed. Waste products are consumed in a separate combustion chamber by a jet of automatically controlled gas heat, leaving practically no ash. After six months service, vacuuming removes all accumulations. The hopper is equipped with a built-in exhaust fan. Ajax-Consolidated Co.

For more information, circle 3-8 on card following page 54.



Hand Brake

Dragging brake shoes are said to be eliminated with the Equipco No. 4000 vertical wheel hand brake with positive quick release. The AAR certified brake works with all 10- and 12-in. cylinders. Controlled release by non-spin wheel, or full, instant release by lever (without wheel spin) is optional. Chain take-up of winding drum is 26½ in., with equal distribution of power. Chain can be replaced without dismantling brake. Union Asbestos & Rubber Co.

For more information, circle 3-9 on card following page 54.

Emulsion Cleaner

The organic solvents and emulsifying agents in Wyandotte 468 are said to remain effective at high dilution rates and to be safe on all metals, including aluminum. It can be used for all forms of pressure-spray, steam vat, or hand cleaning to remove heavy grease, oil, or caked road soils from underframes, trucks, or exteriors of locomotives or passenger cars; for cleaning engine parts during overhaul; for shop cleaning, or for diesel vat cleaning where heat is not available. Wyandotte Chemicals Corp.

For more information, circle 3-10 on card following page 54.

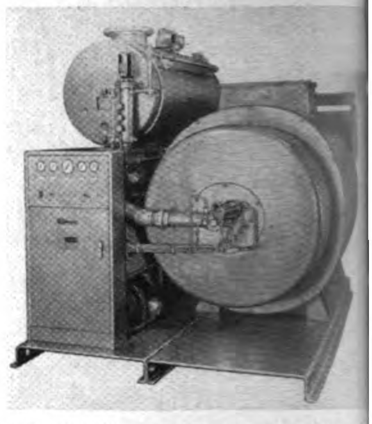
Impact Wrenches

Four air-powered impact wrenches added to the Sioux 400 Series are the 475, 476, 477 and 478. The first two have ½ in. square drive, with, respectively, ½- and ⅝-in. bolt capacity. The last two have ⅝ in. square drive, with, respectively, ⅝-in and ¾-in. bolt capacity. Each wrench has a no-load speed of 8,000 rpm. All wrenches in the 400 Series now feature new impact mechanism and improved high-speed air motor. Albertson & Co.

For more information, circle 3-11 on card following page 54.

Steam Generator

The Va-Power Circ-U-Latic is a forced recirculated, multiple-coil water tube boiler. It is said to produce 99% dry steam within 5-min from a cold start and to be the only package-type unit with design characteristics programmed by an electric computer. Sizes range from 75 to 300 hp. Pressures are 15, 150 and 250 psig. Units are oil, gas, or combination fired, burning No. 2 oil, 900- to 1,100 Btu per cu ft gas. The 300-bhp boiler, a combination oil-gas fired unit, evaporates 10,350 lb per hr from and at 212



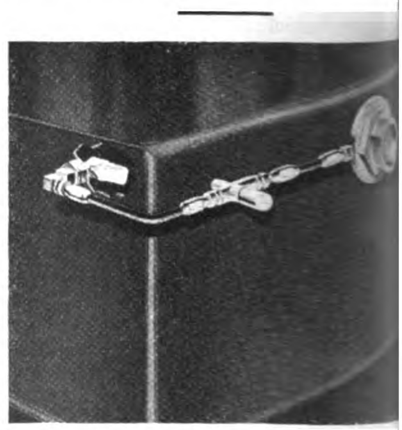
deg F. Standard units are wired for … 230 or 460 volts a-c 3-phase, 60-cycle p… er. All comply with ASME boiler co… Vapor Corp.

For more information, circle 3-12 on c… following page 54.

Epoxy Insulation

An improved mica-splitting Therm… insulation is now standard on large West… house a-c motors of up to 7,000-volt … ings with form-wound coils and for all ty… of fully accessible motors. The ma… change consists of a new epoxy resin. … good resistance to moisture and to … tically all types of chemical contamin… After more than 1,000 hr of continuous … posure to 100% relative humidity … deg C, the insulated windings still had … sulation resistance measured in thous… of megohms. Westinghouse Electric C…

For more information, circle 3-13 on c… following page 54.



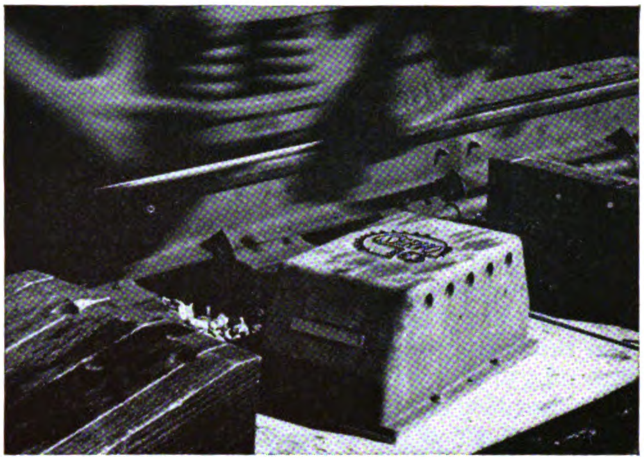
Fueling Systems

Either the original adjustable external flo… or a new internal type float is now availab… for the Aeroquip automatic diesel fuel… unit. Common to both are a push-butt… float bypass valve which allows manual ta… ping of tanks, automatic shutoff at flow ra… from 10 to 300 gpm, and an optional po… tive flow indicator at the nozzle. The i… ternal float is designed for mounting ins… the fuel tank. Installation requires no wel… ing or bracketing. The external float is al… installed without welding to the tank. Aero… quip Corp.

For more information, circle 3-14 on c… following page 54.

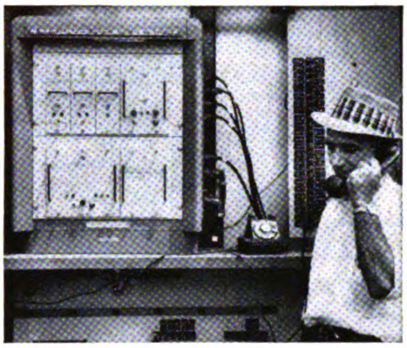
IS THIS JOURNAL SAFE?

Even at 70 miles per hour, the SERVOSAFE® Hot Box Detective gives you the right answer every time!*



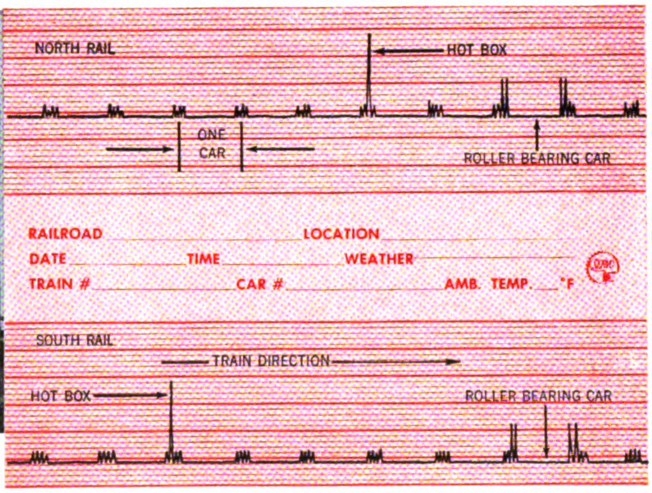
SCANNERS: Located beside the track, sensing elements "look" at the infrared heat radiation of passing journals.

TRANSDUCERS: These electronic "wheel pick-ups" control the scanners' view to suit train speed.

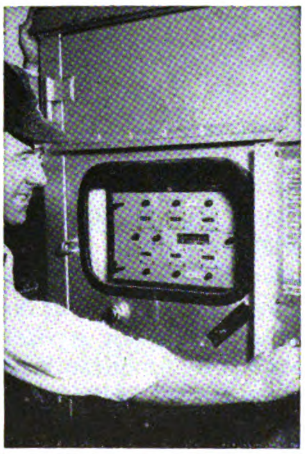


ELECTRONIC COMPONENTS: Housed in a wayside signal case, these units process data from the scanning elements.

RECORDER: Located at trackside, in a remote yard, or dispatcher's office, this unit records the relative heat of each moving journal.



RECORDER CHART: This record of relative heat of journals locates trouble spots for service before they cause damage or derailment.



HOT BOX LOCATOR: This accessory makes an electronic wheel-count for error-free location of overheated journals.

The SERVOSAFE® Hot Box Detective* System is proved in use throughout the U.S.A. and abroad. It quickly pays for itself by preventing derailments, damaged journals, lost train time, and spoiled cargo. When installed at recommended intervals, the SERVOSAFE System virtually eliminates journal burnoffs and derailments caused by bearing failures.—■—The basic SERVOSAFE System can be furnished with SERVOLARM® automatic alarm to tie in with existing signal equipment and with SERVOSIG® Carrier for remote data handling and transmission over standard communications media. Major Class I railroads operating more than half of the total rail mileage in the U.S.A. now use SERVOSAFE Hot Box Detective Systems and new installations are continually being made as part of a general industry effort to reduce operating costs. ■—You are invited to write for detailed technical literature. Inquiries will be handled promptly by our group of hot box specialists.

RAILROAD PRODUCTS DIVISION
SERVO CORPORATION OF AMERICA
111 New South Road • Hicksville, L. I., N. Y., U.S.A.

**Protected under one or more of the following U.S. Patent Nos.: 2,880,309, 2,947,857, and 2,963,575. Other U.S. and foreign patents pending.*

Editorials

Everything's Going to 'L'

"The exception proves the rule" might be altered to "The exception is the rule" when applied to today's freight-car situation. The drive to highly specialized, customer-oriented cars could soon present the AAR Mechanical Division with a problem involving assignment of standardized designations to freight equipment. The standard designations are the two- or three-letter symbols which are required by interchange rules to be stencilled to the right of the nominal capacity stencilling on each side of each car.

In days when all cars were box, hopper, gondola, tank, and other standardized types, there were virtually no problems. Even when the X (box), H (hopper), G (gondola) and T (tank) classifications were being assigned to these cars, however, some long-forgot committee action also designated Class L to cover cars of special design not readily conforming to one of the more generally recognized types. In the past few years the designations of special car types have gone from LO (covered hopper) to LP (pulpwood), to LRC (solid-carbon-dioxide transporter), to LS (Schnabel car), to LT (tank-hopper) and, most recently, to LU (house car with special lading devices) and LM (AirJet car with tanks for dry bulk or low-viscosity liquid commodities).

This is certainly not a functional classification and leaves relatively few designations for what will predictably be an increasing diversity of unusual car types. While the special classification has grown, some of the standard classifications cover car types which are becoming virtually obsolete. For instance, there is a Class V covering ventilator box cars, a type which was of much greater importance before refrigeration became a major factor in transportation. Today, there are fewer than 700 of the Class V ventilator box cars in service. There are now well under 30,000 Class S stock cars operating. This compares with the almost 80,000 covered hoppers (Class LO) and 25,000 pulpwood cars (Class LP).

The covered hopper, despite its roof, is basically a self-clearing type of car which would seem to have made it a suitable candidate for the Class H designation. The LT and LTA cars, the so-called tank-hoppers are also self-clearing, designed for movements of dry bulk materials. Possibly a new classification for all these closed-top hoppers would be in order, if it would introduce complications were they to be included with the open-top cars. The pulpwood car is essentially a flat car and would seem to fit readily into the F classification. Its deck is certainly no more specially equipped than is that of the tri-level automobile car which is now designated as FA. The LU car (page 25) would seem to be a house car that might easily be assigned an X designation.

It is unfortunate that, before requiring railroads to stencil the AAR designation of each car type on each car—mandatory only since 1959, the Mechanical Division did not overhaul and modernize its classification system. A more functional classification might have kept almost every new car design from going to "L."

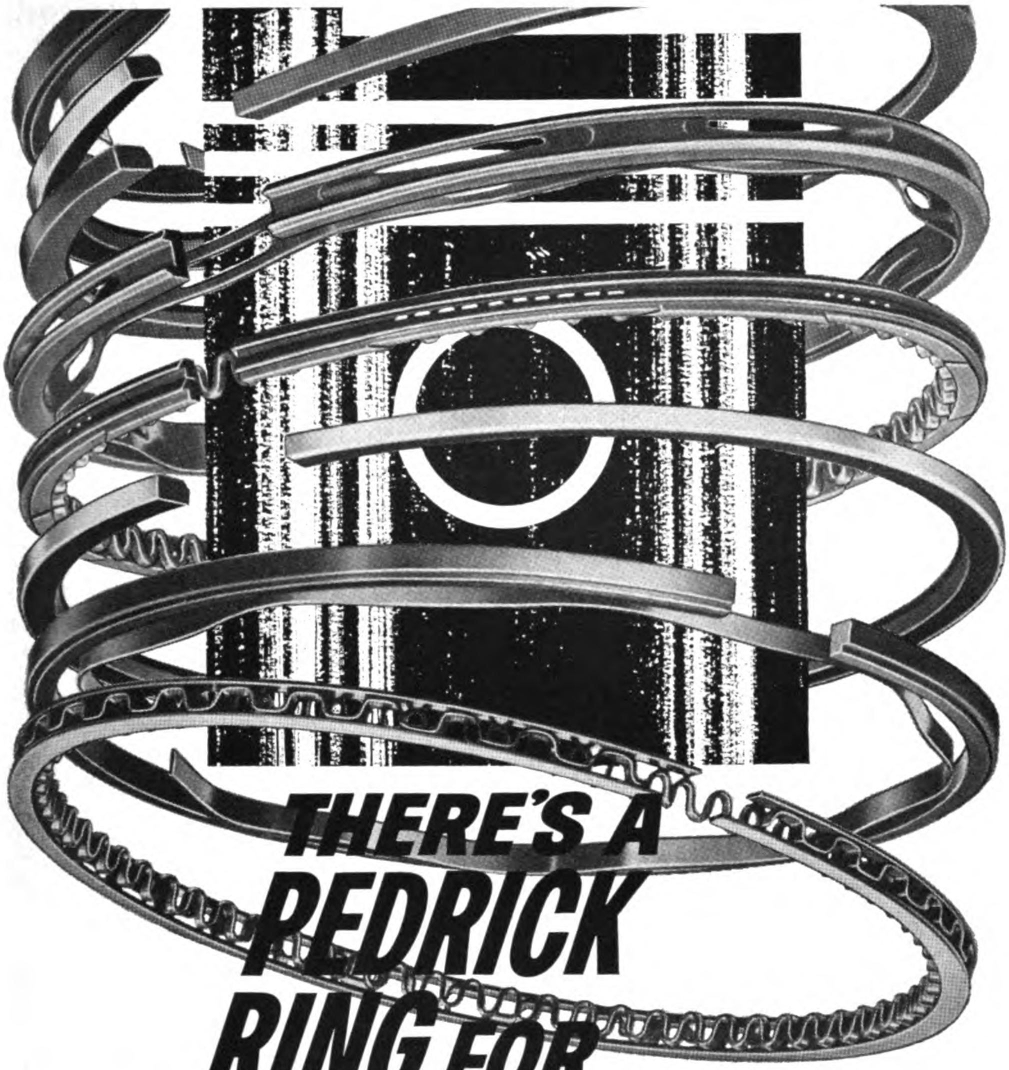
Quest for Crisis

Promise of a "full-blown transportation revolution," sparked by new equality in transportation policies, if government and transportation officers will pull together, is held out in *Quest for Crisis,* a book by James N. Sites, manager of news services, Association of American Railroads. It is published as the report of a year-long Eisenhower Exchange Fellowship study of transportation over much of the world. It relates the experiences and findings of Mr. Sites in 25 countries—from Europe through the Middle East to India and Russia—over a period of 12 months. Riding almost every form of conveyance, Mr. Sites talked with officers of all forms of transportation, ticket clerks, transport minister, shippers, travelers—"anyone we could find who had ideas about ways to move people and goods."

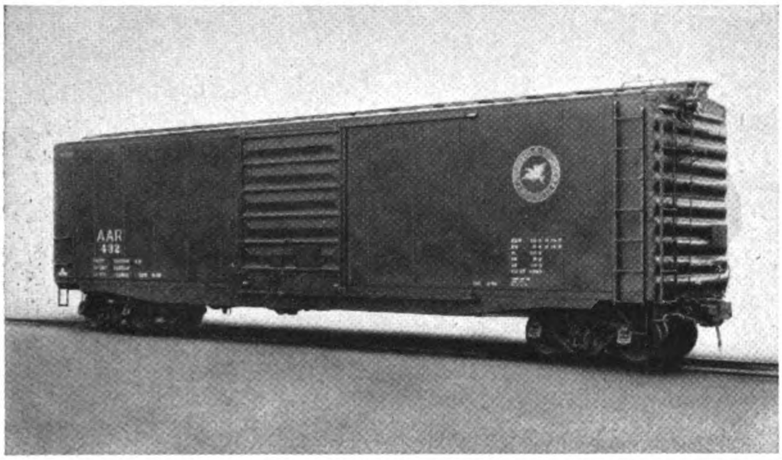
Transport upheavals, he found, generally could be traced directly to a booming motorization drive. On the freight front, almost everywhere except behind the Iron Curtain, the truck was found to have steadily bored into the now-long-gone railroad monopoly. Reaction of railroad men varied from lethargic to explosive. Depending on local transport conditions and the response of governments to competitive changes, railroad fortunes varied from barely hanging on to booming. Behind the varying fortunes of the foreign railroads lie vast differences in the ways governments regulate, tax and subsidize railroads and competing trucks, buses, airplanes and inland shipping. These differences also show up in comparisons between the U.S. and other countries as a group. When it comes to government policies toward railroads, Mr. Sites continues, informed foreigners look at the deteriorating American transport scene with perplexity and disbelief.

A rough pattern for the sound U.S. transportation system of the future begins to emerge when governmental and operating differences are examined and transportation authorities around the world are interviewed, according to Mr. Sites. These clues point up a trail that can lead not only to railroad survival, but to full-blown revival, to a whole new era of growth and better service to the nation. A radically new shape for all carriers, with strength and stability built into the visibly shaky transport industry can be ours for the asking and the doing, Mr. Sites believes. Ways to this goal are examined in detail in the chapters of this book and in summary in the final chapter.

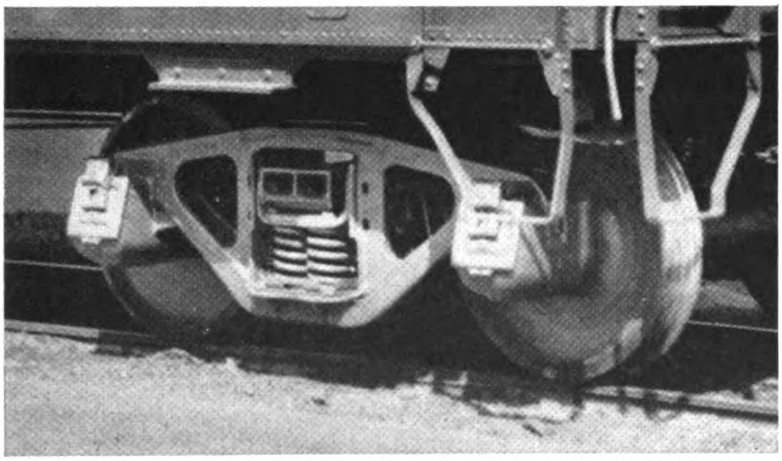
Publisher: Simmons-Boardman Publishing Corp., 30 Church st., N. Y. 7. 223 pages. Price, $5.95.



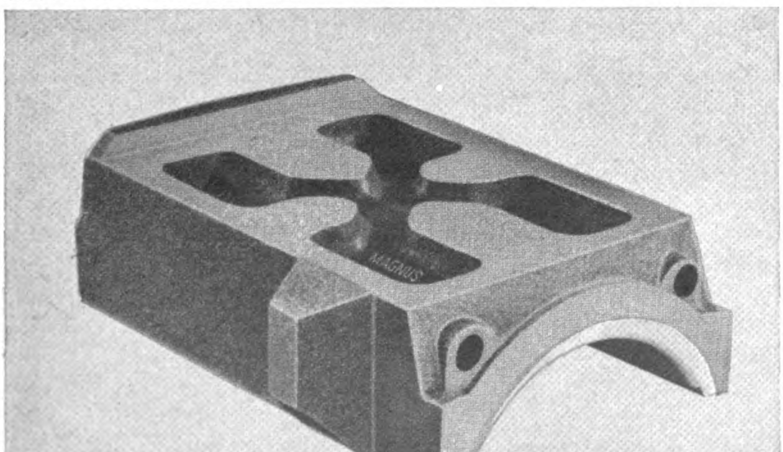
You save $700,000 ON EACH 1000-CAR PURCHASE when cars are solid-bearing-equipped—or you get up to 8% more cars, more hauling capacity for the same initial car investment.



Solid bearing cars AVERAGE OVER 50 CAR YEARS PER HOT BOX—current records indicate more than 850,000 car miles per set-out, an improvement of better than 300% in three years since 1959.



It will cost you $11.85 LESS TO OWN AND OPERATE each solid bearing car, than just to <u>own</u> a roller bearing car—based on current solid bearing operating costs of only $40.86 per car per year.



With NEW MAGNUS FLAT-BACK BEARINGS, these costs will be EVEN LOWER—with performance that promises to hit 2,000,000 car miles per hot box. For complete facts on journal-stabilizing flat backs, write Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

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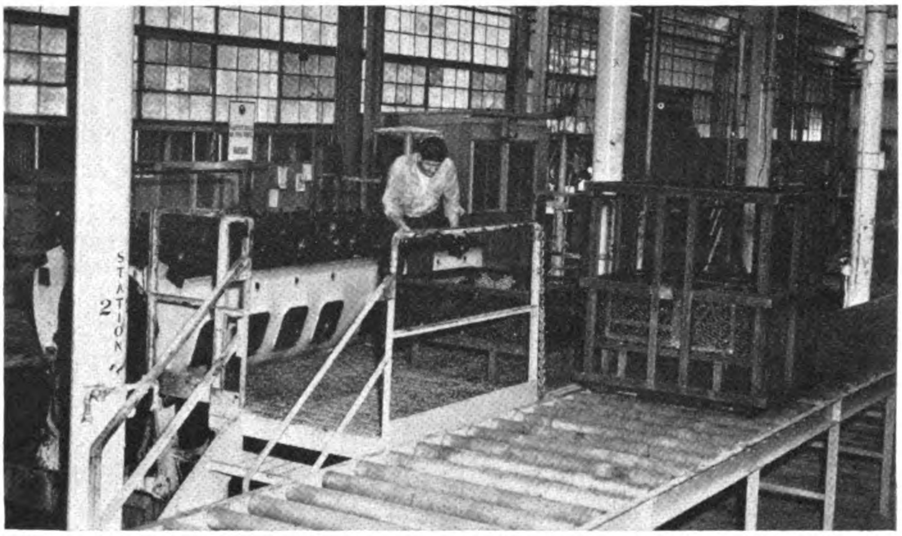
;P Automates Its Diesel Cleaning

Locomotive washing and cleaning of diesel engines undergoing overhaul have been arranged with aim of increasing efficiency

Better cleaning facilities have been d are being installed as a part of uthern Pacific's improvements for :vicing, maintaining and repairing :sel locomotives. Units are cleaned : safety, fire protection, inspection wheels and running gear, and for pearance. Automatic locomotive ıshers have been installed on two in-und leads at major servicing termi-ls, permitting diesel units to be shed each time they approach the vice platform for fueling and sand-;.

The washing cycle per unit is ap-)ximately one minute and the results : satisfactory. When necessary, ne stubborn spots, such as unit ds, are touched up by hand brush-; at the servicing platform. The shing cycle includes an initial or :-wetting spray, cleaning solution ay, scrubbing by rotating-brushes,)f rinse, high pressure rinse and final se. All stages are actuated by elec-: rail switches as the diesels move wly through the washer. Water is)plied from storage tanks. Pressure nps deliver main rinse water at 800 . and final rinse at 150 psi. Water :ased from the spray nozzles at 800 has considerable scrubbing action. Concentrated liquid cleaning mate-s, stored in large holding tanks, are :cted into the solution spray system proportioning pumps, producing desired solution strength. This :hod gives excellent control of solu-ı strength, eliminates waste, and mits changing the solution strength neet operating, weather and other ditions. Two different cleaning :erials are used in the cleaning cess. A detergent with pH 11 and)lution strength of two fluid ounces gallon of water are used for clean-carbody and hood exteriors. The ning gear and underframe are

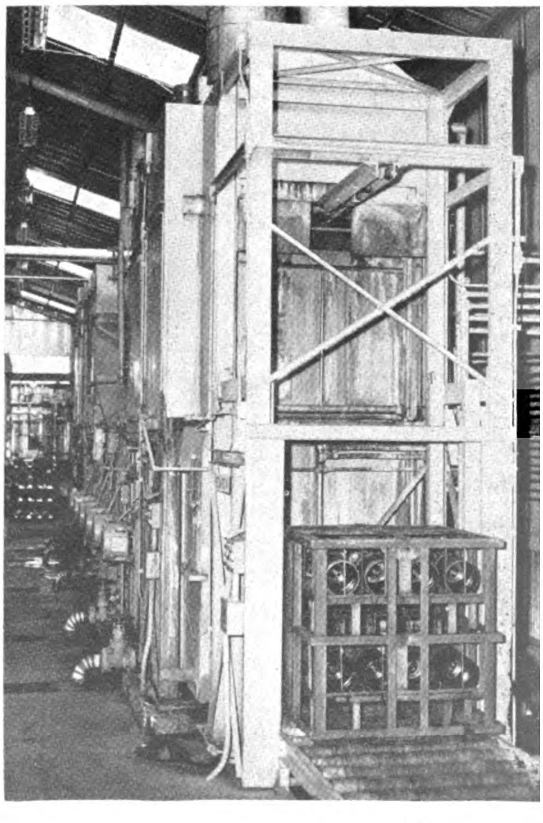


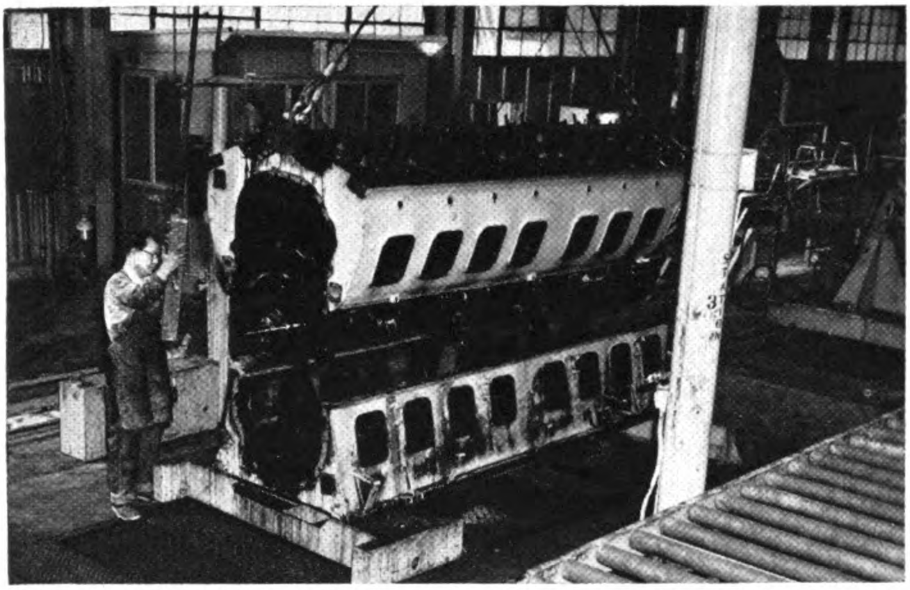
Stripping Station 2 (above) is point where all top-deck parts are removed from engine and loaded into special parts baskets on conveyor. Parts pass through a precleaning tunnel prior to arriving at the automatic cleaning machine (below) where they are decarbonized.

cleaned with a pH 13 detergent using a solution strength of two fluid ounces per gallon of water. The use of these automatic washers has reduced man-hours while the number of units washed has increased 300 to 400%.

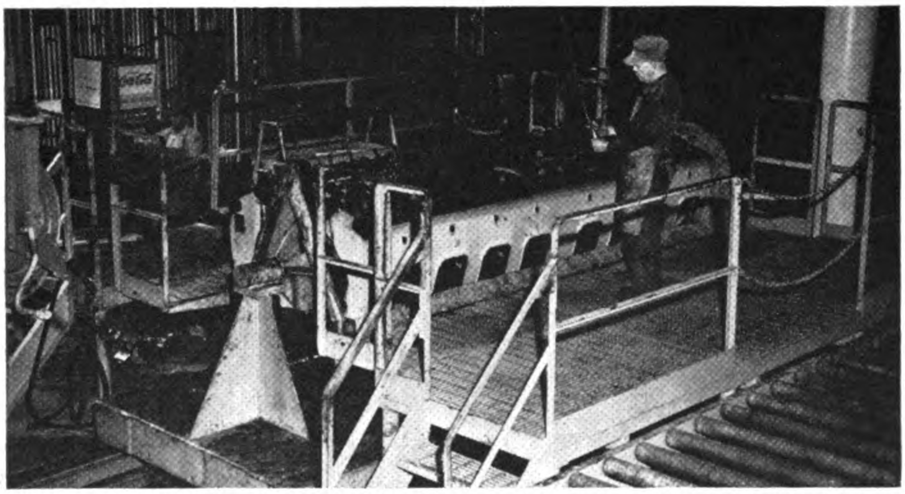
At the Sacramento general shops a new set-up for stripping and cleaning diesel engines is housed in a structure 90 ft by 200 ft with a side extension for miscellaneous parts cleaning. Dis-assembly and cleaning operations are highly mechanized and the design has resulted in a smooth flowing operation at peak production. The anticipated daily work load on a two-shift basis calls for the dismantling and cleaning of two and a half complete diesel en-gines, plus approximately 24 power assemblies received from outside maintenance points. Possible produc-tion is between three and four diesel engines on a three-shift basis. Clean-ing of all internal diesel engine parts is automatic with the exception of the crankshaft, camshaft and piping.

At stripping station No. 1 the top





Station 3 is equipped to remove the A frame from oil pan; components are cleaned separately.



Turning device at Station 4 simplifies handling of the large components of the diesel engine.

deck and handhole covers are moved. The entire engine is sprayed with a solvent type cle and rinsed with hot water which moves excess oil, grease and dirt fore dismantling.

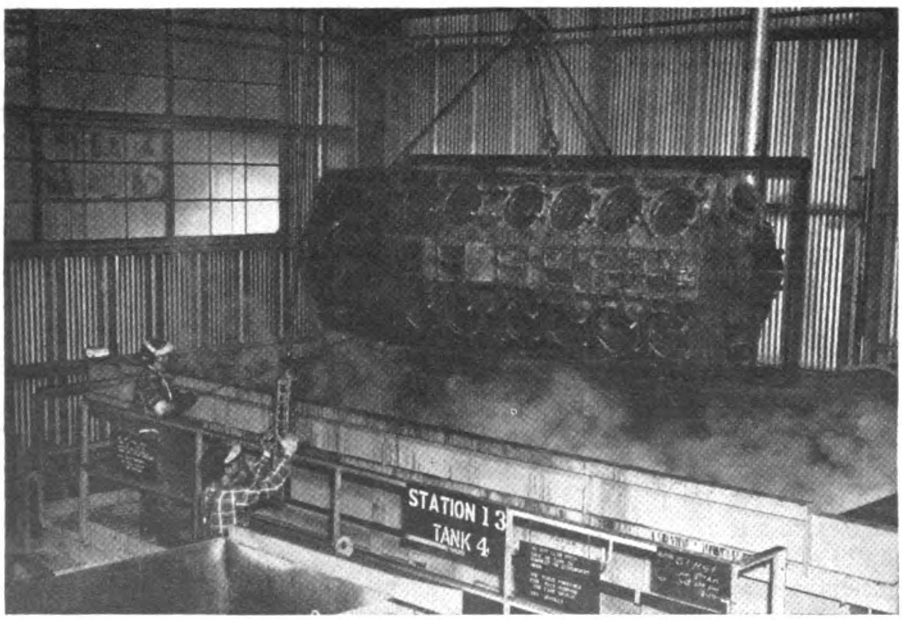
At stripping station No. 2 all deck and engine end parts are rem and placed in special baskets so will be properly spaced for clea Baskets are placed in a master rack on a roller conveyor.

At stripping station No. 3 th frame is separated from the oil and placed at station No. 4. Th pan is then moved by overhead c to a 10,000-gal propeller-agit tank containing a hot, heavy-d caustic cleaning solution.

At station No. 4 the power as blies are removed and placed on cial pallets on the roller conveyor. engine is then rotated in a special ture for removal of the cranks The crankshaft is placed in a s cleaning tank and cleaned with a heavy-duty caustic solution; ri with hot water; then sprayed wi rust preventive solution.

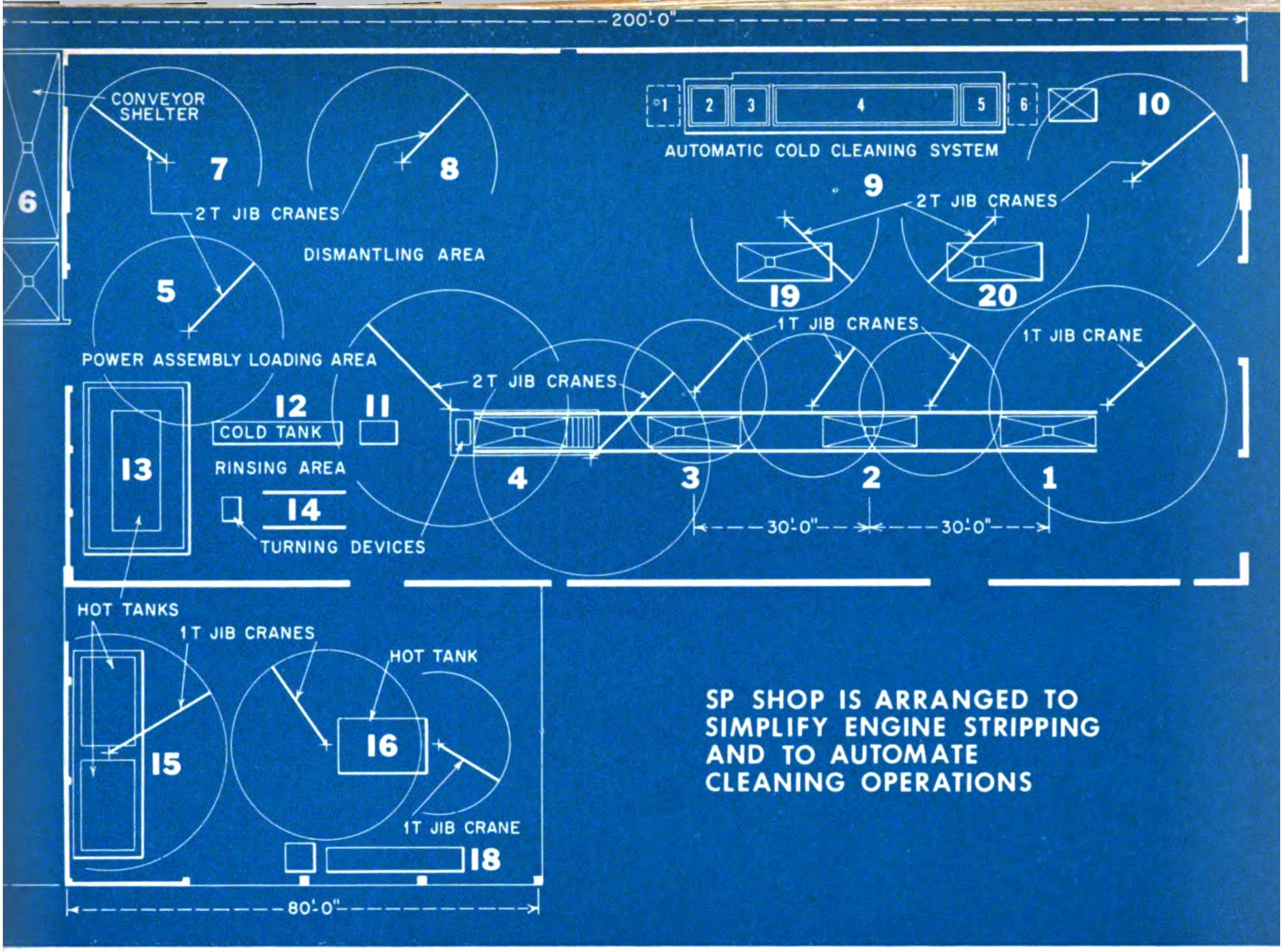
Frame is then placed in the 10, gallon hot tank for cleaning. Rin of frames, oil pans and shafts is d manually. The parts are then spra with a rust preventive solution.

The master parts racks with gine parts from station No. 2 and lets with power assemblies from tion No. 4 roll on the conveyor t 46-ft pre-cleaning tunnel. A powe conveyor moves them with a speed



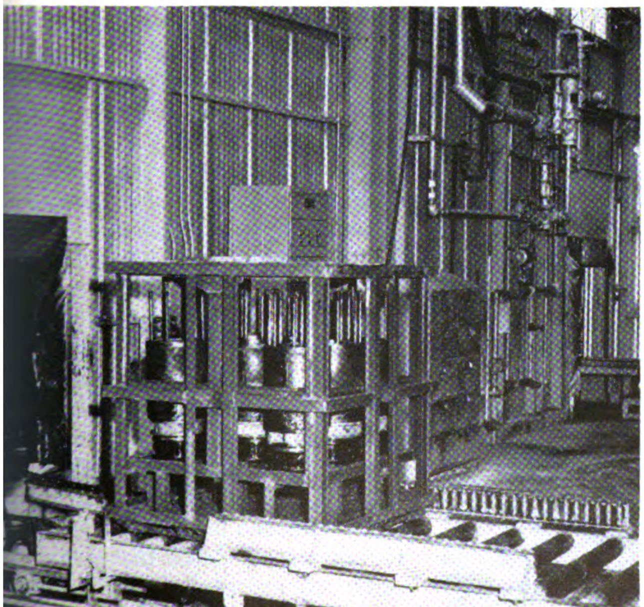
Engine frames and oil pans are cleaned in hot tank. Crankshafts are cleaned in nearby hot tank. Each of these cleaning operations has been assigned a separate station number.

Rinsing of engine components removed from and cold tanks is performed at Station

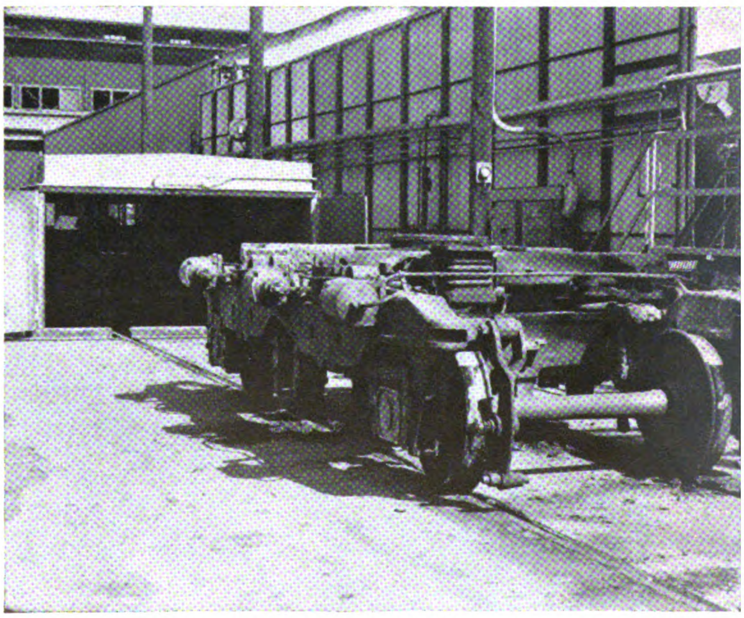


SP SHOP IS ARRANGED TO SIMPLIFY ENGINE STRIPPING AND TO AUTOMATE CLEANING OPERATIONS

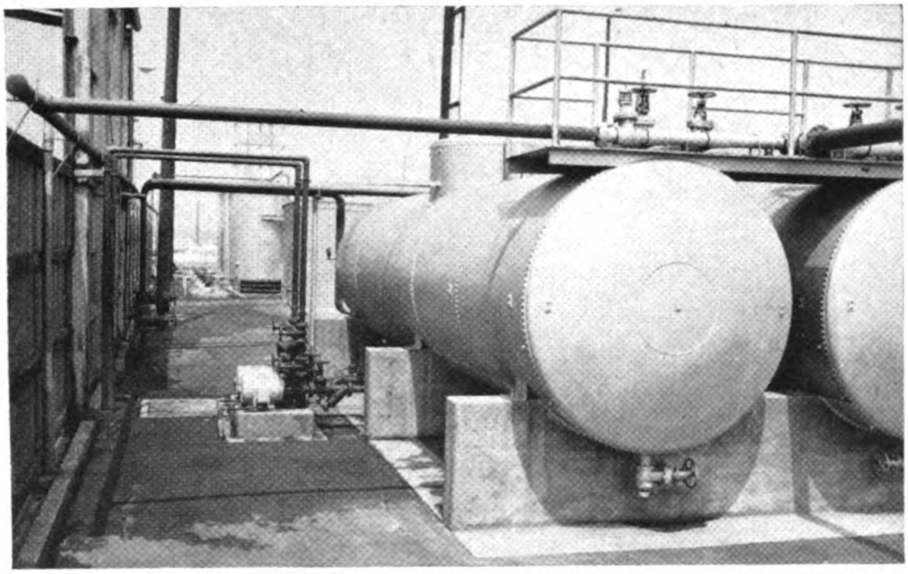
vo feet per minute through a solvent-'pe solution spray, a hot-water rinse nd an air blast. All functions in this ınnel are activated with sonic sensing evices. Upon leaving the pre-cleaning tunnel the master parts racks roll on to the automatic cleaning machine while the pallets with the power assemblies are removed from the conveyor for further dismantling. All parts of the power assemblies are placed in special baskets, moved again through the pre-cleaning tunnel, and are then ready for final cleaning in the automatic cleaning machine.



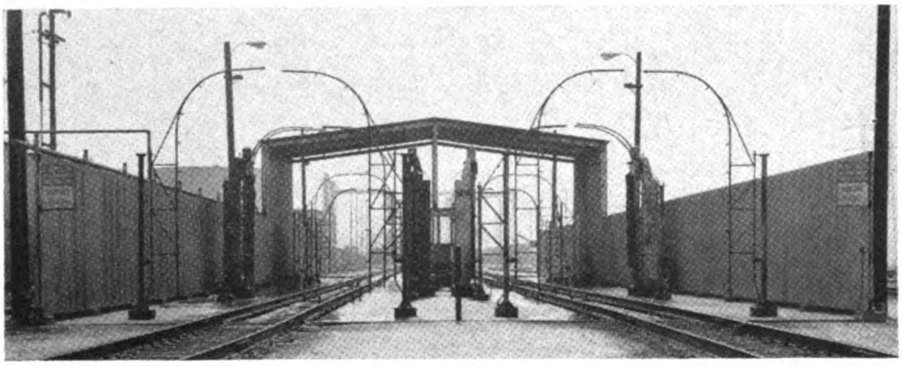
recleaning tunnel is located outside shop building. SP plans installaon of ultrasonic equipment for cleaning injector and governor parts.



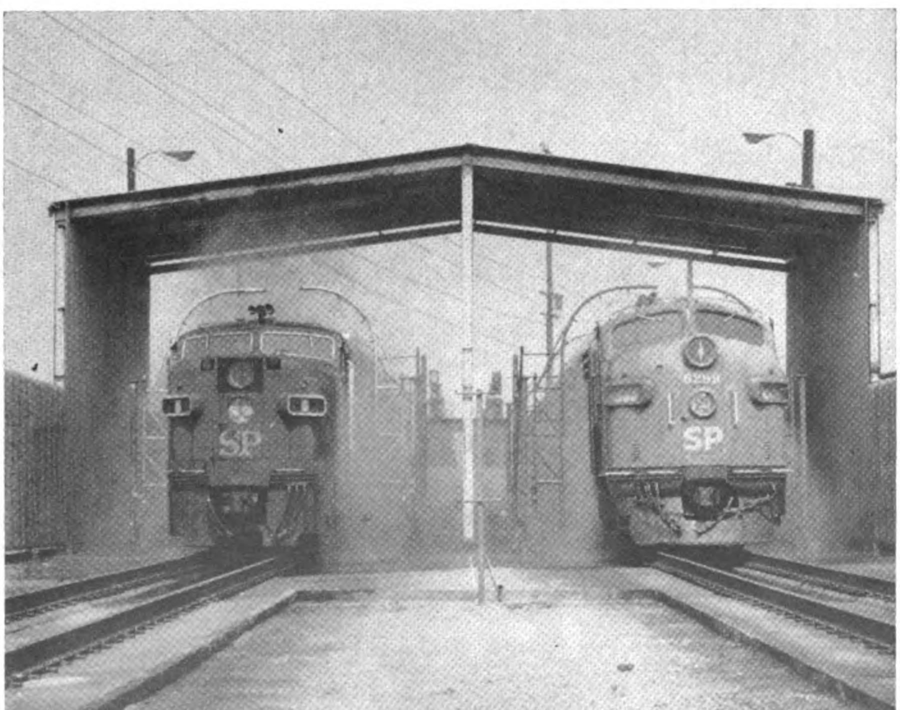
Semi-automated 40-ft tunnel cleans trucks with 7-ft caustic spray. Moved back and forth automatically, largest truck is cleaned in 1 hr.



Water storage tanks (foreground) at locomotive washing facility are served by 150-psi and 800-psi pumps. Cleaning solution tanks (rear) have their own bank of proportioning pumps.



Automatic locomotive washing facility consists of series of spray systems for cleaning carbodies and trucks. Operations are initiated as track swtches are closed by passing diesel.



Washing of locomotives is done each time they come to the servicing platform. The 1-min washing cycle has usually been found to give satisfactory results; some hand brushing is done.

The automatic cleaning machine was specially designed for railroad diesel engine parts. The cleaning cycle consists of six stages:

- Load;
- Precleaning tank (hot heavy duty caustic solution);
- Scale and rust-removing tank;
- Decarbonizing tank (hot heavy duty caustic solution);
- Spray dip rinse;
- Unload.

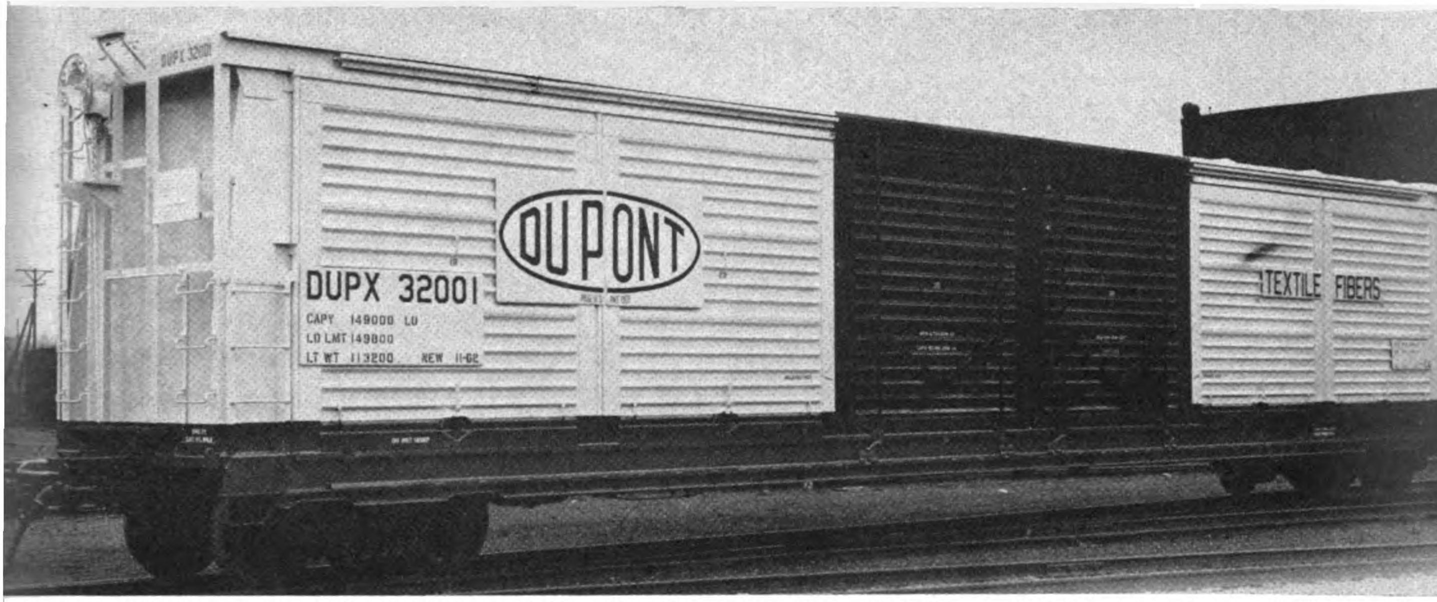
Precleaning tank and 10,000-decarbonizing tank are propeller agitated.

The conveying system in this machine is actuated by hydraulic double acting cylinders with lift platforms to raise the master racks to machine height and in and out of the various tanks. Fully loaded the machine will handle nine master racks simultaneously with a maximum of 2,000 lb of parts per rack. The complete cycle is adjustable to discharge one rack from the machine every twenty to sixty minutes. The present working cycle is 25 minutes. In other words, this automatic cleaning machine when fully loaded will continuously process all internal parts of one diesel engine in 125 min. However, most of the master racks are loaded to only two-thirds capacity and idle time is utilized for cleaning other locomotive parts.

The production capacity of the entire plant is governed by the cleaning time of the engine frame and oil pan sets which is two and a half sets in sixteen hours.

A semi-automatic device for cleaning diesel locomotive trucks has also been installed at Sacramento general shops. A 40-ft tunnel, accommodating the largest truck, has a 7-ft long high-pressure solution spray system in the center. It cleans trucks down to the metal in one hour. Stripped trucks mounted on special dollies, are moved automatically back and forth through the hot solution spray. The heavy-duty caustic solution is heated, recirculated and filtered in a 1,200-gallon tank.

Members of SP's laboratory staff are regularly assigned to check the working solutions of all cleaning operations for correct concentration and proper maintenance of cleaning equipment. This is necessary with respect to economy and required performance. Titration readings of the various hot tanks are reported weekly. Laboratory tests and controls are essential for proper operation of this equipment.



ɼn-beam car, AAR designation LU, is 66 ft 10 in. over end sills and has hydraulically cushioned underframe with 20-in. stroke. Racks in interior d the 4½-ft spindles, each of which carries 1,145 lb of yarn. Incentive rates sparked development of all door car.

)esigns Stress Speedy Unloading

eedy removal of ladings, whether ɜy be raw materials or finished prodts, is an important phase of the de-;n of today's shipper-oriented freight rs. Typical of such equipment are ree cars which have recently gone o service handling materials which ɜ to receive additional processing be-re delivery to ultimate consumers. vo of these cars move dry bulk ma-ials and the third is used for hauling nthetic yarn which is used in the ınufacture of automobile and truck es.

The car for carrying beams of in-strial yarn has nearly two and half ıes the yarn capacity of a conven-nal box car. It is now being field-ted by the Du Pont Textile Fibers ɜpartment. The complete sides of ɜ car are lightweight aluminum slid-; doors that allow direct access to the ling from docks. The beam con-ner car was developed jointly by ı Pont and General American.

The jumbo-size carbody, mounted 100-ton trucks, is 66 ft 10 in. over ɟ sills. It accommodates 81 beams industrial yarn, compared with a ıximum load of 33 beams in each of ɜ standard box cars previously used. t load is almost 93,000 lb.

All components of the interior racks carrying the beams are permanent tallations with no removable parts be lost. The beams, while detach-le from the car for winding or removal of the yarn, are also considered an integral part of the car. Light weight of the car is 113,200 lb.

The car, when its design was proposed to the AAR Mechanical Division last year, was assigned the mechanical designation LU.

Tank Hopper Cars

Dow Chemical Co. has just acquired 14 aluminum tank-hopper cars which are now in service moving granular chemical products from the Plaquemine, La., plant of Dow's Louisiana Division. Assigned primarily for bulk movements of polyethylene granules, these aluminum cars supplement a fleet of 60 steel covered hopper cars which Dow has previously operated in this service.

The 14 tank-type aluminum hoppers, ordered in September 1962, were built by Greenville Steel Car. They are based on a design originated by the Aluminum Co. of Canada (RL&C, Oct. 1960, p 42). Prior to delivery of the new Dow cars, there were 217 of the Alcan-design cars in service in Canada and the U.S. The majority are owned by the Canadian National.

The 3900 cu ft Dow cars have a length over strikers of 55 ft and are mounted on 70-ton trucks. About 14,-700 lb of aluminum sheet, plate and extrusions are used in each car. Light weight of a completed car is 40,400 lb.

The tank-hopper has no center sill. Coupler forces are delivered into the body through stub sills constructed of conventional 51.2-lb steel Z-sections. Each of these sills is riveted to a ⅝-in. aluminum shear plate which extends from end sill to bolster and from side sill to side sill. The shear plate is welded to all the aluminum structural sections and riveted to the steel bolster. Forces are transmitted through the carbody primarily by the side sills, essentially 11 x 9³⁄₁₆ x ⁷⁄₁₆ in. extruded angles and by the side plate—6 x 4⅜ x ¼ in. angles. Complying with AAR recommendations, the side sills extend through to the car's end sill for the purpose of giving better distribution of coupling impact forces and more positive attachment of the carbody.

Floors and curved sides are formed of ⅝ in. plate. The roof is ⅛ in. material. Sheet and plate are 5083 aluminum alloy; extrusions, such as the side sill and side plate, 6061 alloy.

Because of the wide variation between light and loaded weights, cars are fitted with Westinghouse empty-load brake equipment. Trucks are equipped with Wabcopac package brake units with composition shoes.

The Southern's "Quad-pod," a 3,-200-cu ft car with four pressure tanks for hauling dry bulk solids, is a larger version of the three-tank "AirJet" car first put into service in 1961 by the

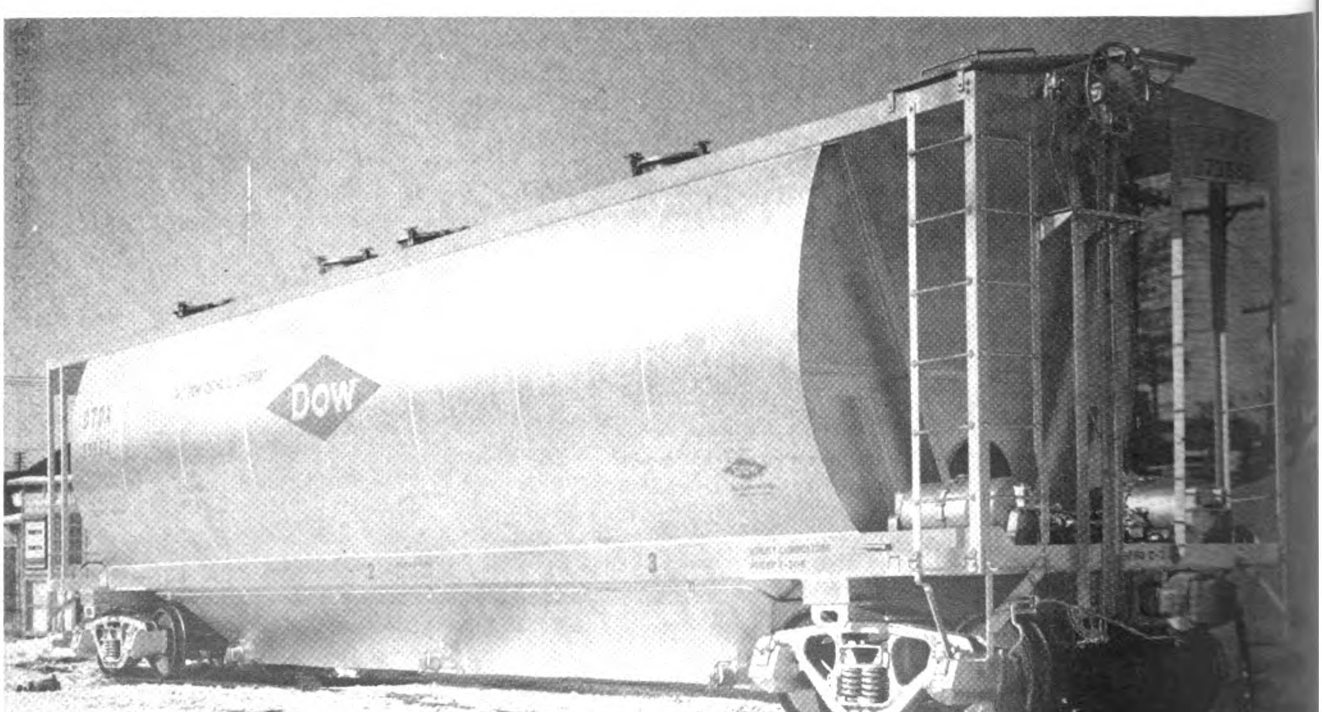
Quad-pod compressed-air unloading makes it possible to bypass the screw and bucket conveyors used at most bulk concrete plants. Car will be m ing bulk cement from manufacturing points to sidings where it can be unloaded directly into trucks or storage bins.

Halliburton Co. of Duncan, Okla. (RL&C, June 1961, p 6). Air pressure is used to empty the tear-drop shaped tanks on these cars. Prior to completion of the Southern car, a number of the three-tank, 2,400-cu ft cars had been moving fly ash in the Midwest. Tanks are ASME coded at 40 psi.

Cement, rather than fly ash, seems to be the primary material the Southern car is destined to haul. "We feel that the unique features of the car will enable us to offer shippers definite economic and handling advantages for moving cement and other suitable bulk products," D. W. Brosnan, Southern president, stated.

The Quad-pod can carry up to 102.5 tons of lading in its four 800-cu ft tanks. First test shipment of cement moving from Knoxville, Tenn., to Cleveland, Tenn., where it went into the bin of a ready-mix concrete supplier. Compressed air forced the 600-barrel load through a series of pipes and hoses directly into the top of t bin. Southern estimates that "wh perfected," Quad-pod will unload less than an hour. This compares w the four or five hours which are r quired for the unloading of a stand hopper car.

Tanks and piping for the car p chased by the Southern were fab cated by Halliburton. Thrall built th car underframe. AirJet cars are ma keted through Pullman-Standard an Thrall.



Tank-hopper body is divided into three 1,300-cu ft compartments, each equipped with a pair of Enterprise 6-in. pneumatic unloading nozzles wh make unloading from either side possible. Roof of each compartment has three 20-in. diameter loading hatches arranged in triangle.

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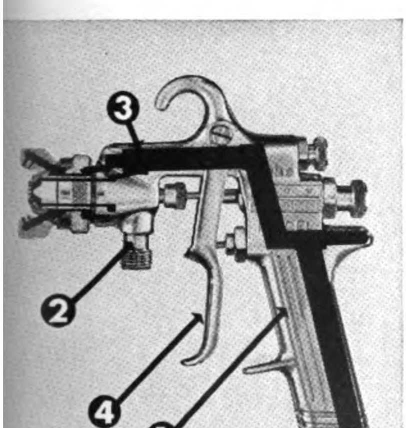

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The corrosion resistant stainless steel fluid passages are Binks exclusives. Stainless steel fluid threads eliminate seizing and stripping. These bonus features assure longer gun life.

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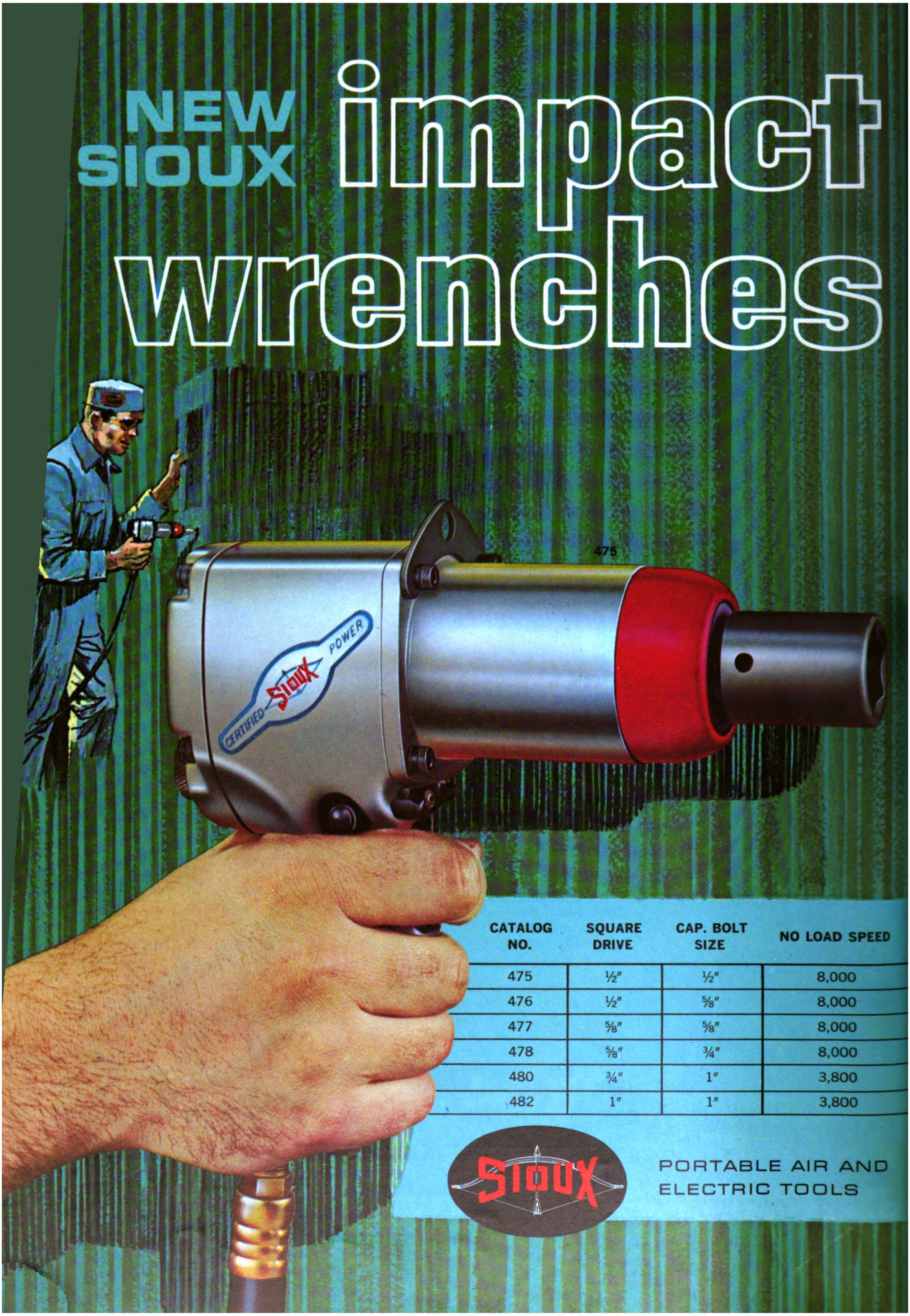

CATALOG NO.	SQUARE DRIVE	CAP. BOLT SIZE	NO LOAD SPEED
475	½″	½″	8,000
476	½″	⅝″	8,000
477	⅝″	⅝″	8,000
478	⅝″	¾″	8,000
480	¾″	1″	3,800
482	1″	1″	3,800

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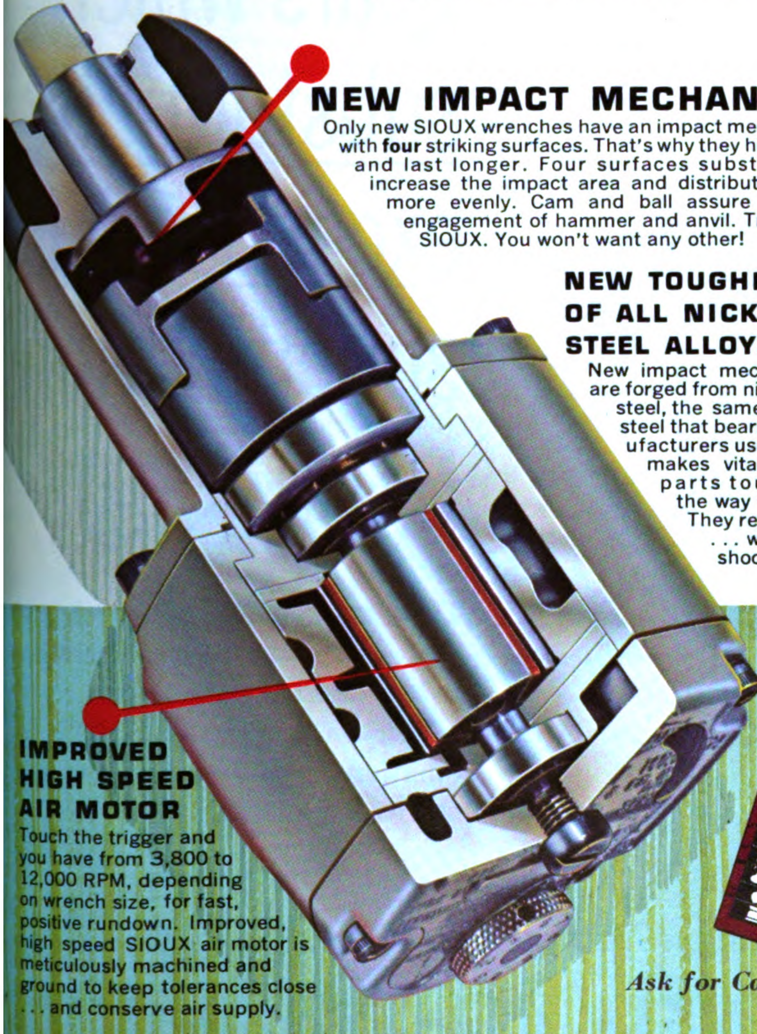
You're in for a surprise the first time you run down a nut or bolt with a new SIOUX 400 Series Impact Wrench. They're faster-hitting, smoother-running than ever because of a *new* impact mechanism and an *improved* air motor. Each trigger squeeze cuts seconds off your work . . . seconds that add up to a lot of labor saved! And the new Sioux Impact Wrenches are tough enough to tackle any job—assembly or repair. Four-cornered, one-piece housing protects air motor. An oil reservoir is built into the handle. Wrenches are reversible and carefully balanced to minimize operator fatigue. They give long, trouble-free service. Choose the one that suits your work—from 3/8″ to 1″ square drive—and start saving yourself time, money and effort.



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Touch the trigger and you have from 3,800 to 12,000 RPM, depending on wrench size, for fast, positive rundown. Improved, high speed SIOUX air motor is meticulously machined and ground to keep tolerances close . . . and conserve air supply.

Ask for Catalog 63

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U.S.A.

lco Builds First 'Century' Diesels

$3 million order for 15 locomo- recently placed by the Erie- awanna is for new model units h are just going into production lco Products. To be delivered to E-L, starting in April, are "Cen- 424" units, one of three new types esel-electrics, all of which Alco nates as Century models.

announcing the new series, W. G. r, Alco president, stated that "the series is the result of the com- 's research and development pro- to meet market demands of the e." He pointed out that the large ntory of 1948-1952 diesel-elec- in service is becoming increasing- xpensive to operate. Mr. Miller ipates the Century series will cut ating costs by as much as 44%, pared with 10-yr old units. Three ury locomotives have been intro- d, but Alco expects other high- epower domestic units to be added e series. The three new units:

Century 420—a 4-axle, 4-motor, 0-hp model;

Century 424—a 4-axle, 4-motor, 0-hp model;

Century 624—a 6-axle, 6-motor, 0-hp model.

he Century series incorporates y developments in design as com- d with previous Alco 2,000- and 0-hp units.

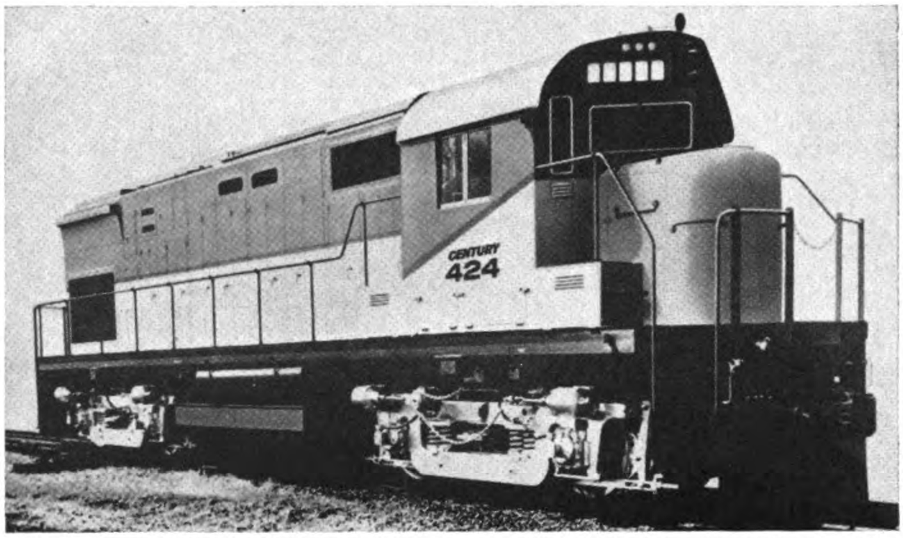
ir is blown by a fan through a avane filter, pressurizing and cool- electrical rotating equipment. Aft- aving cooled the generator, the air scharged into the engine compart- t under pressure. This prevents from entering the compartment n the outside. Carbody filters have been eliminated from the engine compartment hood. Cooling air, supplied to the traction motors through ducts, is supplied by a single blower, gear-driven from the generator. Multiple traction-motor blowers and belt drives have been eliminated. In addition to the two Dynavane filters, a panel-bath filter provides secondary filtration for the engine combustion air.

Doors on both sides of the engine compartment have been hinged so that they can be folded back to expose the entire side of the diesel engine, with only one center post intervening. All engine cylinders are easily accessible. The radiator and engine hoods can be removed for major maintenance and realignment. There are also two side doors in the radiator compartment. In addition to the usual door from the cab of the locomotive to the front hood, a hinged access hatch has been added to permit easy removal of auxiliary equipment located inside the hood.

Radiator cores have been mounted horizontally to make them self-cleaning. This system is designed to increase radiator efficiency and produce a more even flow of air over the radiator. The radiator fan has been mounted directly on top of the eddy current clutch, eliminating the need for a Spicer drive, fan shaft, and upper bearing. The air compressor in the radiator compartment is direct-connected to the engine with a longer shaft to simplify alignment. The compressor has a greater sump capacity.

The lube-oil filter, strainer and cooler are mounted on a prefabricated module, reducing the amount of pressure piping require and making it possible to remove the assembly through the engine-hood side doors. The dynamic braking system has an outside air intake to improve grid cooling. The control compartment contains a completely static control system and is sealed to exclude dirt. The low front hood and V-shape windshield are designed to increase the field of vision for the operator.

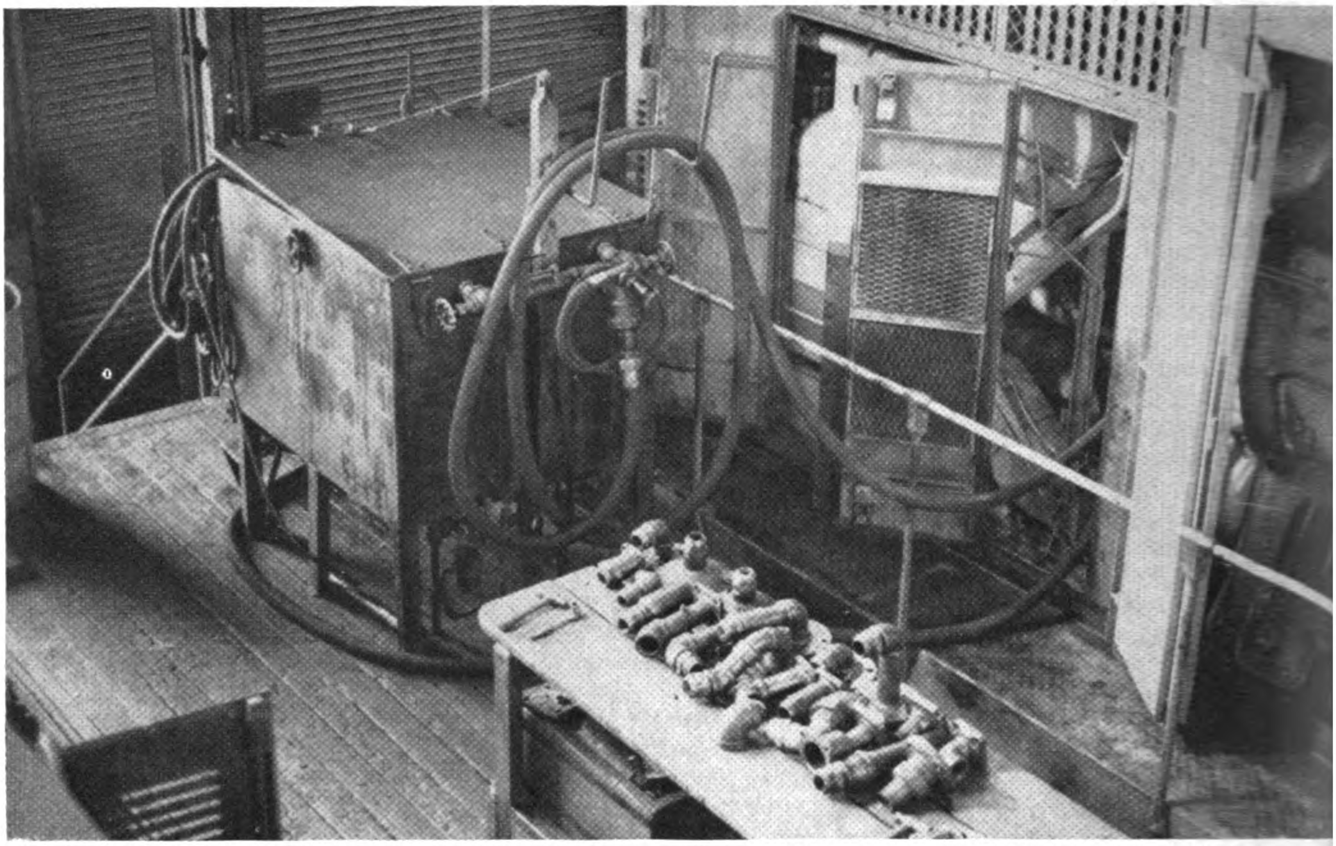
All models are powered by Alco 251, 4-cycle supercharged engines—the 12-cylinder version in the 2,000-hp units and the 16-cylinder in the 2,400-hp units. Several thousand of these engines have been produced since the engine was first introduced in 1956. The 251 has a 9-in. bore and 10½-in stroke. It is supercharged and equipped with aftercoolers.



V-shaped windshield and central air system with no panel filters are features of the new units.

Characteristics of Alco Century Locomotives

	Century 420	Century 424	Century 624
epower for traction	2,000	2,400	2,400
el arrangement	B–B	B–B	C–C
ion motors	4	4	6
el base ft-in.:			
ch truck (rigid)	9 – 4	9 – 4	12 – 6
tal locomotive	43 – 4	41 – 10	51 – 0
imum track curvature, deg:			
ultiple-unit operation or with train	30	30	21
ngle unit without train	39	39	25
ipal dimensions, ft-in.:			
eight over cab	15 – 1	14 – 11⅝	14 – 8¼
idth, max.	10 – 1⅝	10 – 1⅝	10 – 1⅝
ngth, inside knuckles	60 – 2½	58 – 10	66 – 1
ght, lb	240,000	256,000	335,000
cating oil, gal	200	250	250
oil, gal	1,200	2,000	2,000
ne cooling water, gal	250	320	48
l, cu ft	28	28	320



Cleaning machine is on platform between two shop tracks. Adapters on bench are used for making connections on different locomotives.

SAL Cleans Oil Coolers Regularly

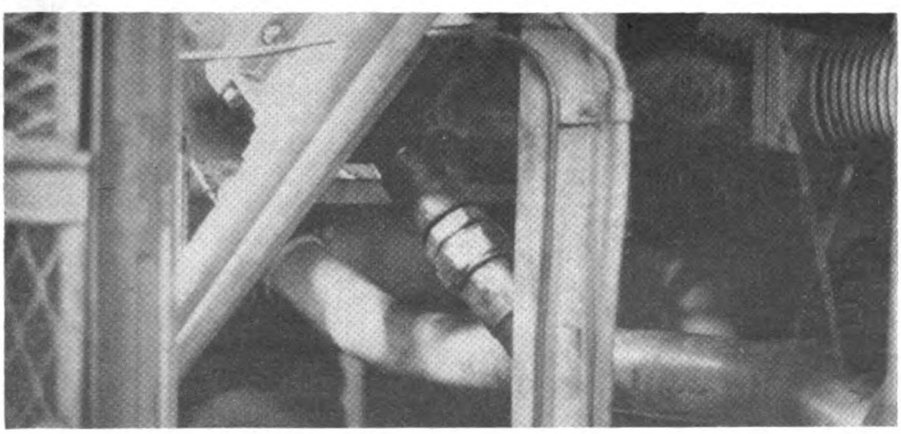
Cleaning of locomotive lubricating-oil coolers is a part of the preventive maintenance program of the Seaboard. This cleaning is normally done once a year on each locomotive—usually in conjunction with the annual or semi-annual inspection. It may be done at other times if the condition of the engine or its lube oil indicates cleaning is necessary. The road's laboratory makes regular lube oil analyses.

The Seaboard locomotive shop at Jacksonville, Fla., has built a special cleaning machine which is used for this work. The machine is mounted on one of the shop's elevated platforms between a pair of tracks on which units scheduled for oil-cooler cleaning are spotted each day.

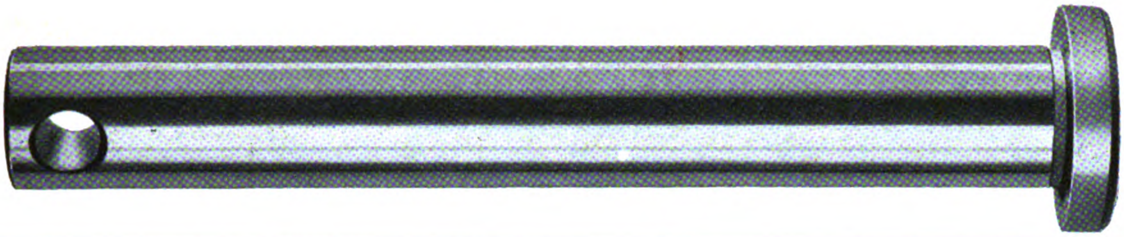
An organic solvent or distillate type cleaning solution is used. This material is stored in the heated tank of the cleaning machine and is circulated through the oil cooler at 200 gal per min by a centrifugal pump. To isolat the oil cooler so it can be flushed o General Motors locomotives, the flex ble couplings between the diesel en gine and the equipment rack a opened for installation of hoses to an from the cleaning machine. On Al units Dresser couplings have been in stalled in the lube-oil lines to and fro the oil cooler to make possible t same procedure. Special adapte with flanged fittings have been ma to simplify the application of the hos on different types of units.

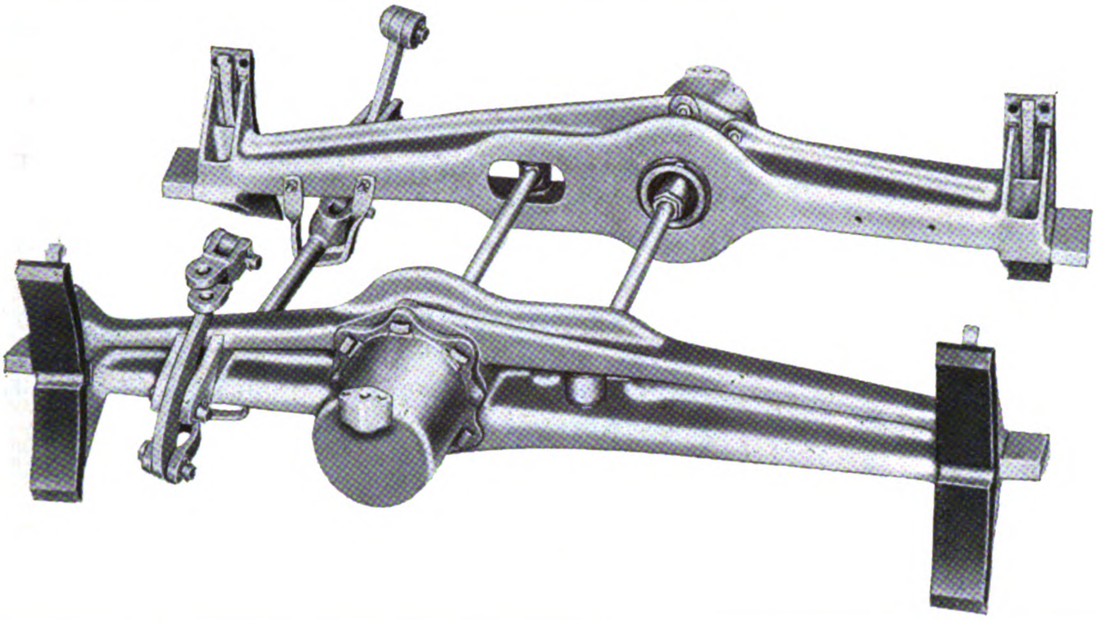
Pressure developed by the cen fugal pump can be varied, but is no mally 8 to 10 psi. Care is taken ne to exceed a safe pressure for the co er being cleaned. Usually the cleani cycle is two to three hours, with t shop regularly cleaning four or m oil coolers daily.

The ability to deliver solvent un pressure from the cleaning unit h led to its utilization for diesel eng cleaning. For this, a separate s hose is attached to the outlet side the pump. Engines are cleaned at time that an oil change is made.



Adapters of different designs are needed. Here hose is fastened to cooler on GM GP-9.





Westinghouse uses Ex-Cell-O Pins in New WABCOPAC* Brake Assembly

Long-wearing, high carbon, induction hardened and accurately-smooth pins are the qualities that have built the Ex-Cell-O Pin reputation for troublefree service on more than 200 U.S. and Canadian roads.

And these are the qualities which the Air Brake Division of Westinghouse Air Brake Company specified in the design and manufacture of its new WABCOPAC Brake Unit for freight cars.

Just as Westinghouse Air Brake uses Ex-Cell-O Pins to make possible lower maintenance costs for its customers, you too can specify Ex-Cell-O for original equipment or replacement use and get the same performance in a complete line of pins and bushings for locomotives, passenger and freight cars.

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62-59RR

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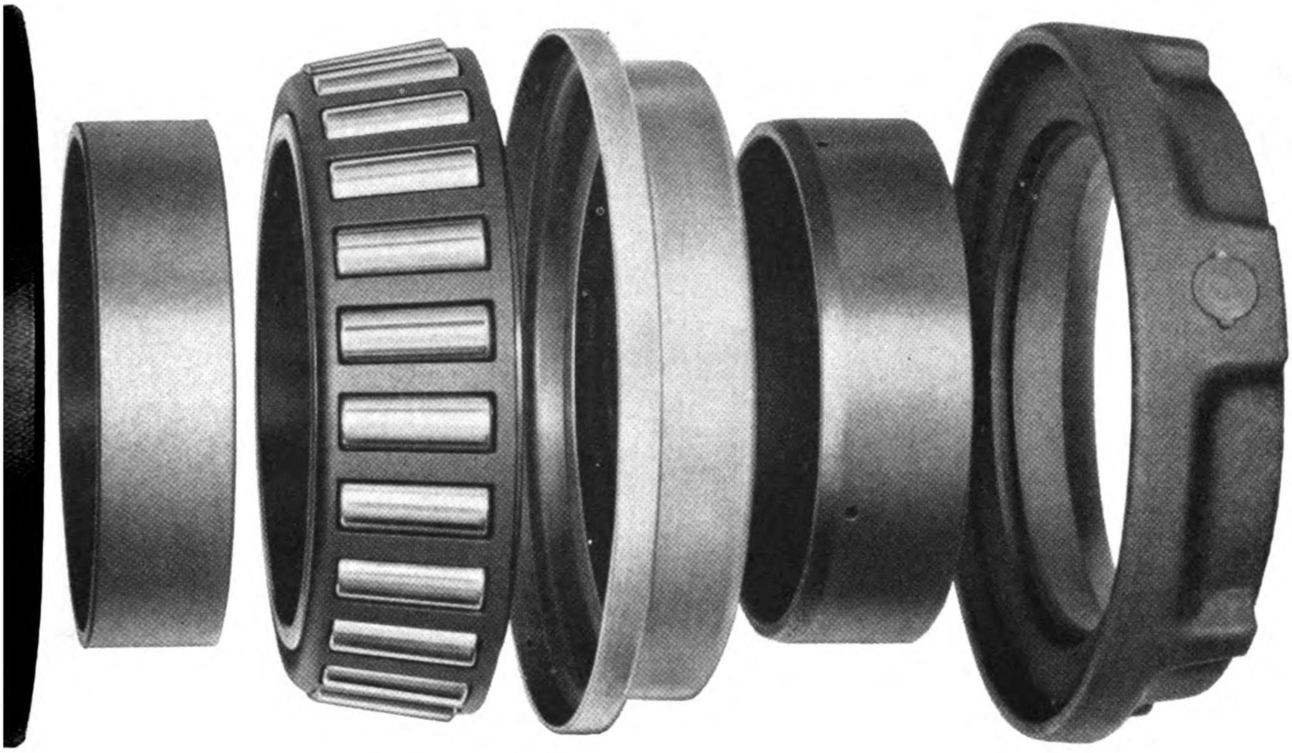

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ecret is in the steel and precision manufacture. We pioneered the tapered bearing design for railroads. We have ıilroad roller bearing research for over 30 years. Now practically all tion bearings on freight cars are tapered. And the steel in Timken bear- ıickel-rich to provide long life. We make it ourselves, an extra step to quality that no other American bearing manufacturer takes.

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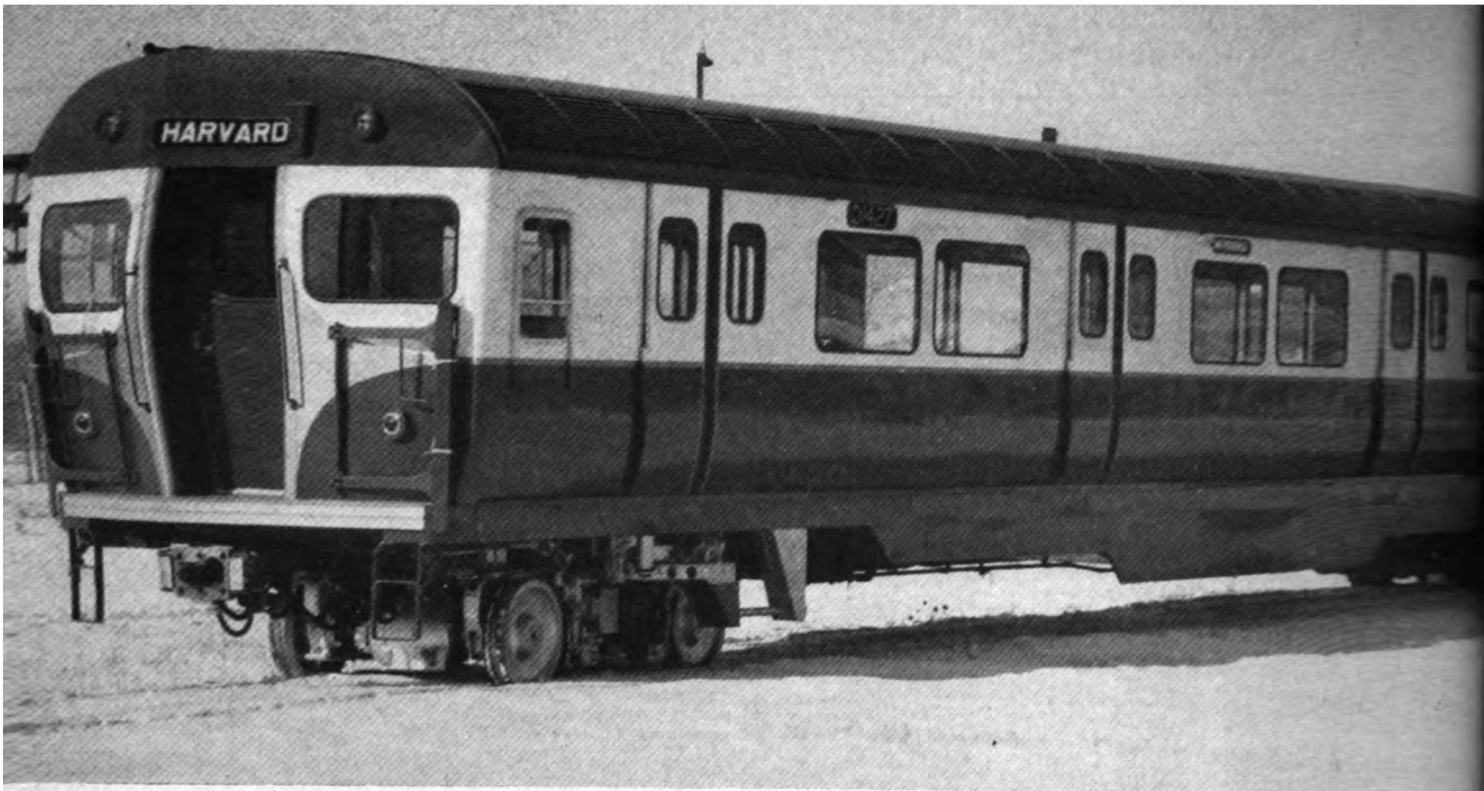


Semi-permanently coupled in two-car sets, the 92 Cor-Ten steel subway cars now being delivered will replace 135 old cars on one of Boston's most

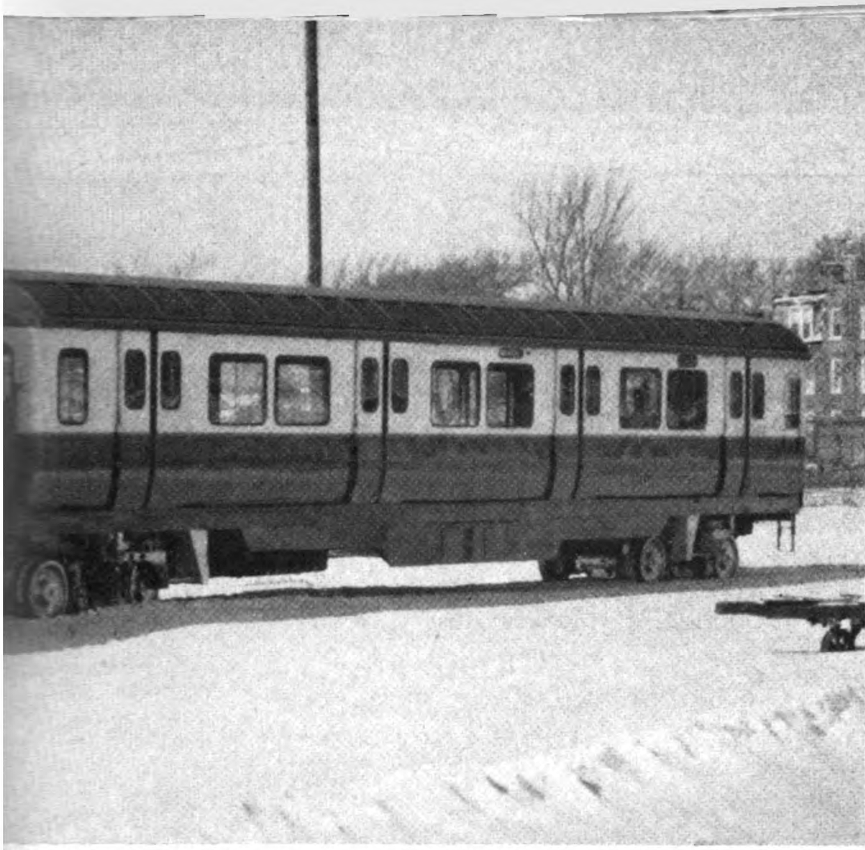
Alloy-Steel Equipment Is Replacing A

Interior colors include blue walls and ceiling, beige vinyl floor, coral seats.

The 92 alloy-steel rapid transit cars being built by Pullman-Standard for Boston's Metropolitan Transit Authority will replace all 135 heavyweight cars now in service on the Cambridge-Dorchester line. The new cars, semipermanently coupled into 46 two-car sets, have bright interiors and exteriors which contrast with the 45- and 50-yr old equipment previously used. MTA anticipates a major reduction in maintenance costs.

Cars now scheduled for replacement have had the distinction of being the largest rapid-transit cars operating in the U.S. The new cars will be slightly longer. Their 69 ft 6 in. length over anticlimbers is 2½ in. greater than the older equipment. A curved side configuration above side sills adds 8 in. of aisle space, increasing theoretical capacity of each car by 22 passengers. Curved sides were first used in MTA cars put in service on another rapid transit route in 1957 (RL&C, Dec. 1957, p 34).

Seating capacity of each of the new cars is 56 with its standee load rated at 266. Normally, they are operated in trains of two and four cars, but m-u operation of up to eight cars is possible. With the high performance trac-



ɨit routes, a line about 9 miles long over which service is to be speeded by 4 min.

ꞩting Cars on MTA Line

ı equipment used, it is expected : running time over the 9-mile te can be cut by 4 min when all new cars are in service. Scheduled ed is approximately 26 mph; top ed, 55 mph.

ıction Motors

Each car is powered by four 100- 300-volt traction motors with pairs nected in series for 600-volt oper- ›n. The General Electric and West- house traction motors are stand- ized with respect to mounting and ninals. The GE motors are mount- longitudinally in the trucks and se-coupled to the axles by right- ¦le double reduction transmission ts. The Westinghouse motors are unted transversely in the trucks and ıpled to the axles by parallel-drive ısmission units. MTA states that ; will give an opportunity to test and npare, under identical operating ıditions, the two contrasting and mewhat controversial" gear units. : electrical equipment includes the M control package which makes ex- sive use of static components. Con- l on the Westinghouse cars is auto- tic pneumatic cam-switch type with static current limit relay and voltage regulators. The two types of control are completely compatible for multiple-unit operation.

The braking system is a dynamic motor brake combined with supplementary tread brakes. The Westinghouse Cineston master controller regulates acceleration and braking. Maximum dynamic braking rate is 3 mphps; maximum acceleration, 2.5 mphps on tangent track. The dynamic brakes are fully effective down to speeds of approximately 10 mph. When the dynamic brake fades, the air brakes automatically apply and complete the stop. Air braking is done by Wabco G type individual package units with composition shoes.

The cars are built of Cor-Ten steel, including the entire underframe, body structure and sides, main and monitor roof sheets. There are four two-leaf sliding doors on each side of car. The entire exterior is painted.

The two-unit sets, semipermanently coupled, consist of one A and one B car, each having a cab at one end. Equipment on the A car includes motor-generator set and an Edison 32-volt battery supplying current to both cars for traction control, and all auxiliary car circuits. The B car has the motor-driven 30-cfm air compressor for both units. Each car has a complete set of traction and braking controls and individual heating and pressure-ventilating systems.

The couplers on both ends of each car are automatic "hinged-head" type, giving mechanical, air and electric coupling. An electric coupler, consisting of a 21-contact insulating block is mounted on each side of the coupler head. Couplers are being supplied by Ohio Brass Co.

The draft gear, of the pre-loaded rubber-cushion type, contains an emergency release feature designed to shear at loads greater than 150,000 lb to bring the anticlimbers of adjacent cars into engagement.

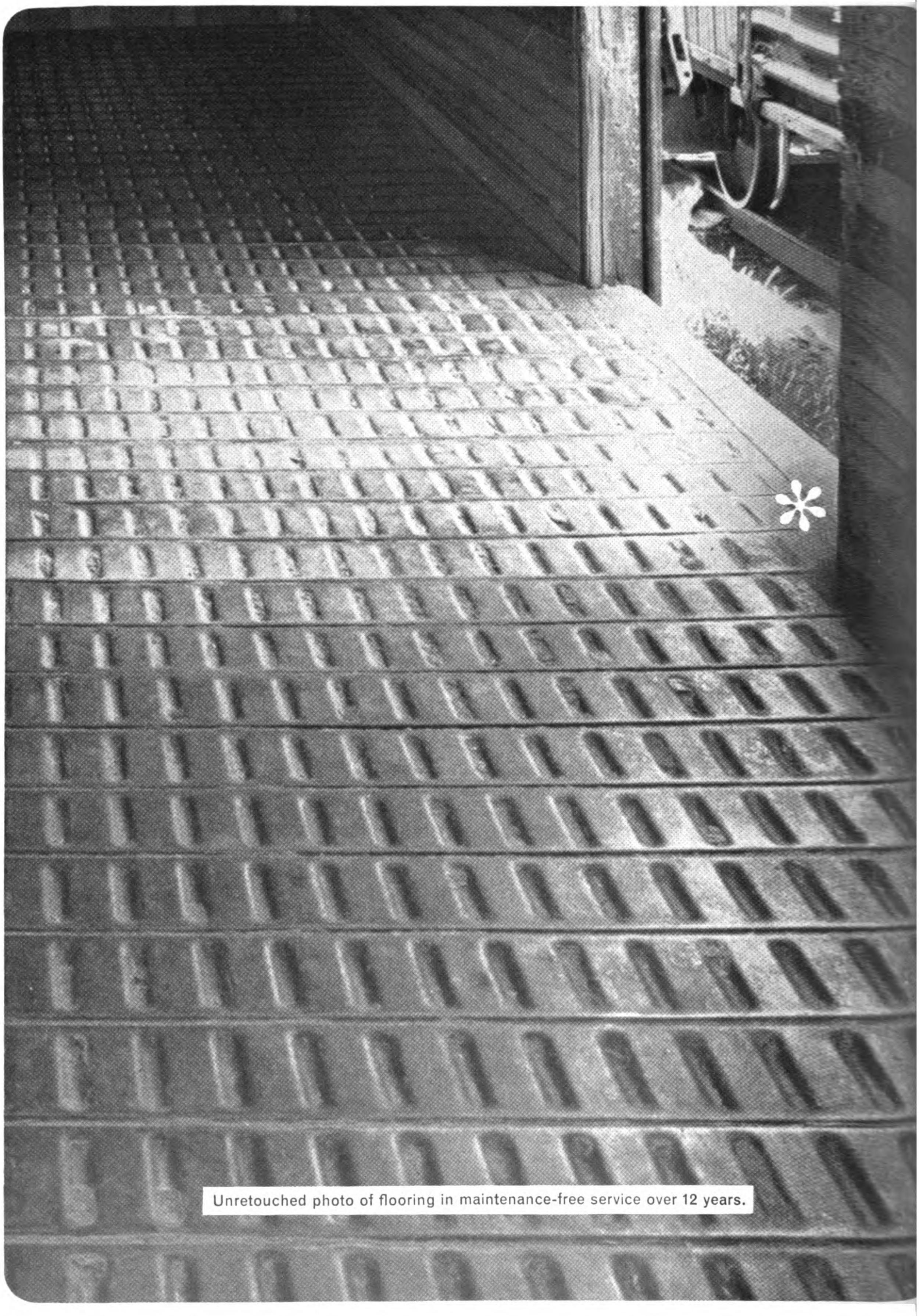
Interior Finish

Floor covering is ⅛-in. x 9-in. square vinyl-asbestos tile glued to floor sheets of 5-ply fir plywood having a galvanized steel plate attached to the underside. The ceiling, wainscoting, pier panels and inside finish at ends and cab partitions are ⅛-in. laminated plastic with integral colored melamine facing. All interior trim is satin finish. The longitudinal seats are molded of red fiberglass-reinforced polyester plastic. Interior finish of windows is molded integrally colored plastic, shaped to eliminate window sills. Side and end windows are stationary sash, consisting of a single $\frac{7}{32}$-in. pane, mounted in body sheets with rubber molding.

Heat from the traction-motor resistors, augmented with 20-kw auxiliary electric heaters, is used for controlling car temperature. The system automatically maintains a temperature of not less than 45 deg F in the carbody. Each of the two centrifugal blowers on a car discharge directly into adjacent resistor compartment. Air intake to the blowers is from interior of car through louvers in door headers and seat risers. Heated air is blown through longitudinal air ducts and outlets in the stainless-steel seat risers. The blowers cool the control resistors at all times when the car is in operation. When air is not required for car heating, it is automatically vented by heat dampers under the car.

Pressure ventilation is provided by six Westinghouse overhead Rail-vane fans having a total capacity of 18,000

(Continued on page 42)



Unretouched photo of flooring in maintenance-free service over 12 years.

Boston Transit Cars

Continued from Page 2

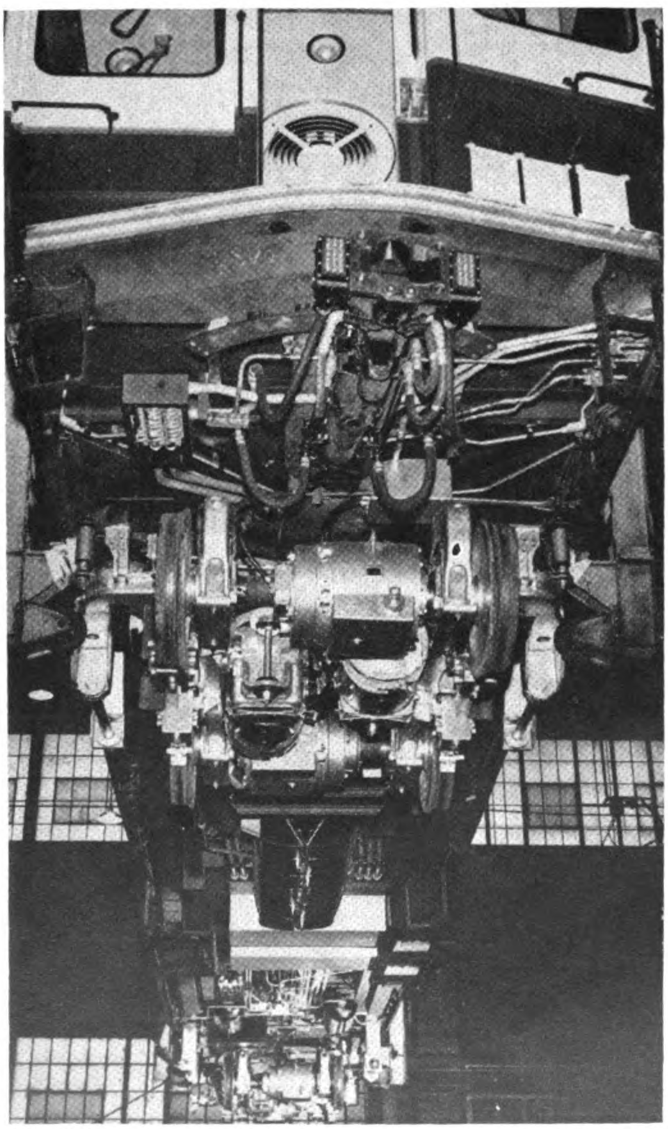
cfm. Fresh-air supply is taken from the monitor on the roof which is fitted with a continuous series of louvers on each side. Dampers actuated by pneumatic engines close the side openings in the monitor when necessary. Three rows of Mazda incandescent lamps, ceiling-mounted in stainless steel fixtures, give interior illumination. There are four 20-in-series circuits.

Each car has two General Steel four-wheel inside-journal trucks with one-piece cast-steel frames. The bolster springs are mounted between the truck bolster and carbody. Combined air and coil springs support the cast-steel bolsters which are stabilized horizontally and vertically with hydraulic shock absorbers. The helical springs, positioned inboard and adjacent to the rubber bellows, are designed to carry the nominal weight of the car. The air spring is designed to support the passenger weight, with pressure varied as load changes.

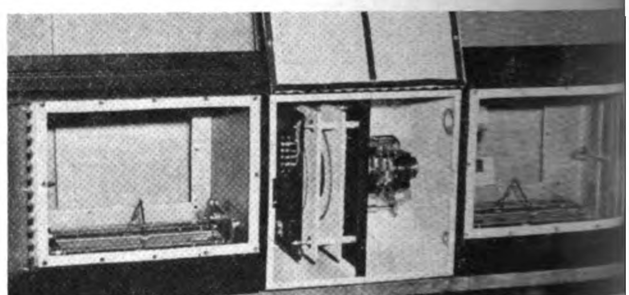
Air Spring Trucks

Truck wheel base is 6 ft 10 in. The wheels are 28-in. diameter, AAR Class BR. Truck equalization is accomplished by means of pedestal springs. Although the design of these trucks is not entirely unique, it is the first time that a relatively large number of U.S. rapid transit cars have been equipped with trucks having the bolster springs interposed between the truck bolster and the carbody. Application of this development is an outgrowth of MTA's inclination toward truck inboard journal design. With springs interposed between the tru bolster and the carbody, it becom quite possible for trucks of inbo journal design to have even wider eral spacing than is usual with com parable outboard journal trucks. Th MTA reports, should provide a mu better roll stability while at the sa time maintaining a good vertical spr rate. Air springs on the cars shou allow vertical ride qualities to rem constant, irrespective of the passen loading, and loading does not alter platform height of the car.

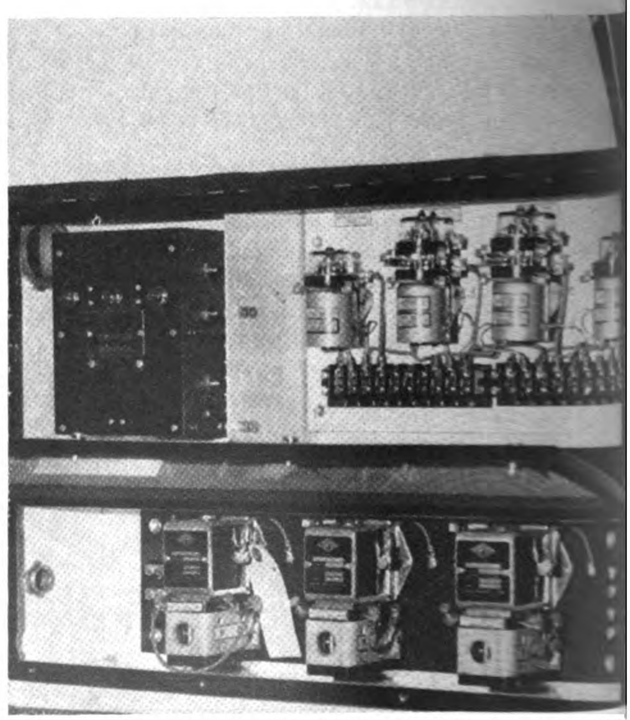
Last of the 92 cars is schedule delivery to the MTA by June 1. C of the entire order is in excess of million.



Half of the cars have Westinghouse traction motors, transversely mounted. Remainder, like one being moved by overhead crane in P-S shop, have longitudinally mounted General Electric motors with right-angle drive.



Car heating depends primarily on utilizing waste heat from traction-m resistors. Vapor unit modulates heat by regulating fan speed and adjusting head and dump dampers with positioning motor (cen



Control panel in carbody includes transistorized heating and ventilati control (upper left); four door relays (upper right); contactor for ventilating fans (lower left); two auxiliary heat contactors.

Understanding Semiconductors

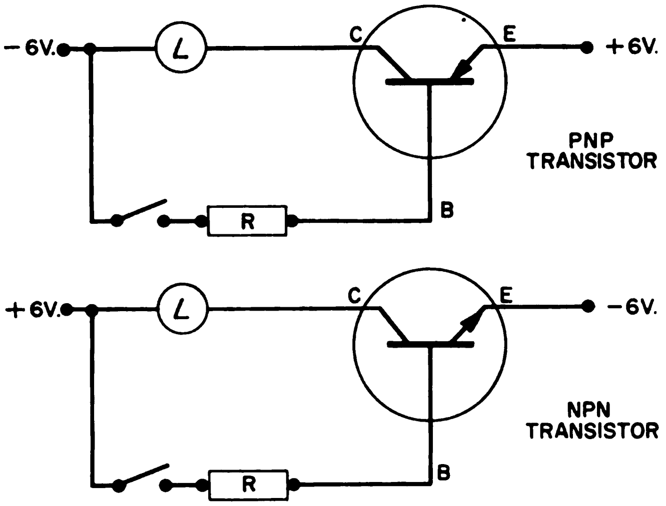
Part 4—Transistors

By R. L. Brittin

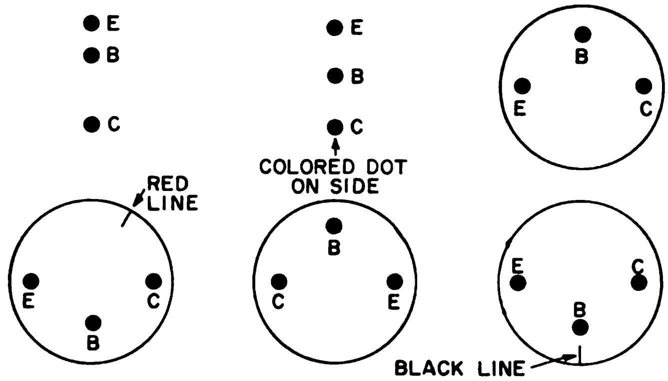
Transistors fall into two categories of polarity—PNP (Positive-Negative-Positive) and NPN (Negative-Positive-Negative). The PNP is most frequently used and to this point has been the only one illustrated. The only difference in the two types is in the polarity of the supply of power and the direction of the arrow on the symbol for emitter. Lead arrangements both on small signal transistors and larger power transistors have been standa[rd]... Diagrams show the arrangements for both types.

During the manufacturing process there are man[y] ... made to transistors to determine their characteristi[cs] ... for what application they are best suited. However ... a piece of electronic equipment is proved and in s... the test boils down to simply "Good" or "Bad." ... majority of cases, failure will be in the nature of s... or open circuit elements and can be diagnosed w... ohmmeter.

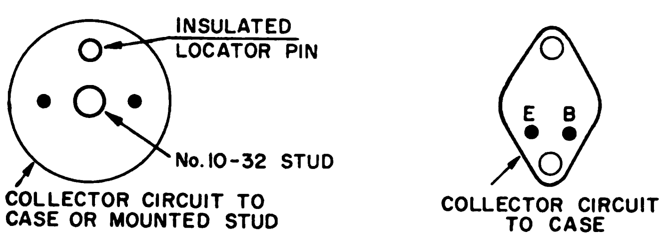
Already discussed has been the testing of diod[es] ... ing similar methods, it is possible to test a transi[stor] ... though there were two diodes in one container. I...



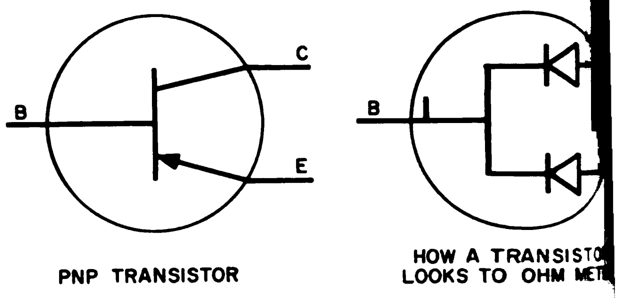
Polarity of power marks difference between PNP and NPN transistors.



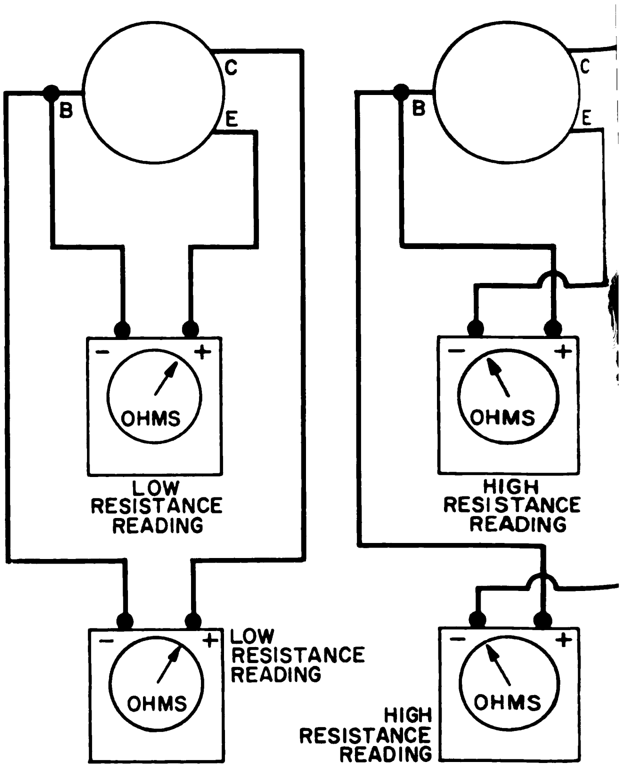
Lead arrangements are standardized on small signal transistors.



Power transistors also have lead arrangements which are standard.



Transistor can be tested as though made up of pair of diodes.

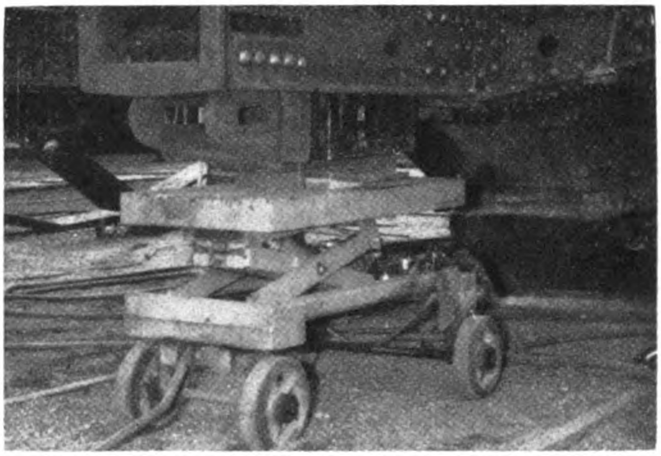


Arrangement of ohmmeter leads shows how to test a transistor.

tion to connecting the meter as shown, you should ch... for short between collector and emitter. On power tr... sistors, use a low range on the ohmmeter. On small s... nal transistors, never use less than "ohms x 1000" s... because the current from the meter could cause dam[age]. When testing NPN transistors, the high and low readi[ngs] will be opposite from those shown.

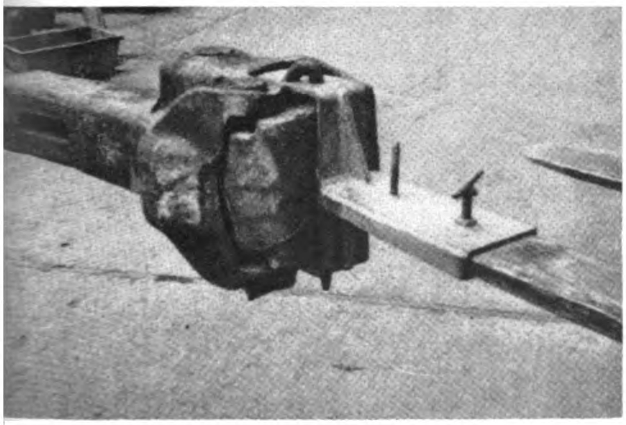
Fourth of a series of articles explaining basic semiconductor operation and testing, originally prepared for Illinois Central electrical department employees. Mr. Brittin is IC traveling electrical inspector. Part 1 appeared in December 1962 issue, p 41; Part 2, in January issue, p 41; Part 3, in February issue, p 32. This is the concluding installment of the series.

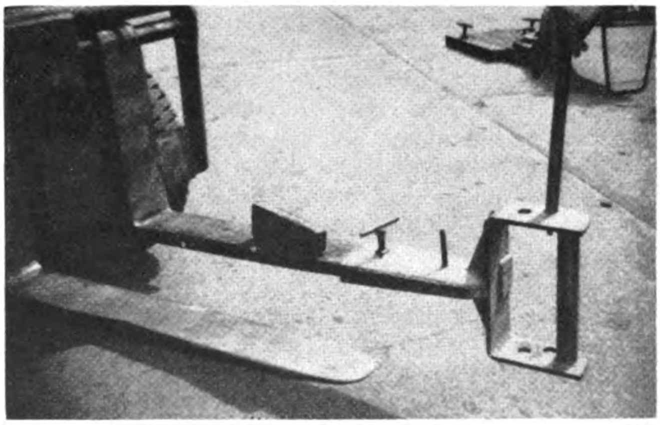
raft-Gear Elevating Device



levice which can raise and lower draft gears of cars undergoing re-'s at the Waycross, Ga., shop of the intic Coast Line has not only made job faster, but has also made it :h safer. ACL shop officers stress : the unit, after being properly tted, can be operated with no one r it. This means that, should the vy draft gear shift while being raised into position, there should be no possibility of injury. The device, which was designed and built at Waycross, has a large top surface supporting the draft gear and its carrier. This 41¾-in. by 17$^{15}/_{16}$-in. platform and its scissors-base lifting mechanism are commercial products which the ACL adapted for its service. They have been mounted on a hand truck. For installation, a reconditioned draft gear is moved to the elevating device by the overhead shop crane. It is placed over the draft-gear carrier, and the device is rolled into position under the draft-gear pocket. The unit is then elevated and stopped in its raised position while the carrier is secured to the flanges of the center sill. The device is then lowered and pulled from under the car.

lolder for Applying Couplers





coupler applicator used in connec-n with a fork-lift truck to apply ight-car couplers at a car repair fa-ity of a western road is mounted on 5-in. channel with a welded cover ite tapered slightly to fit one of the :-truck forks. At the end is a verti-l member and pin for attachment to : coupler knuckle. The vertical ite, welded and bracketed to the box annel, is 12½ in. long by 4 in. wide and flanged top and bottom to extend 7 in. over the upper and lower faces of the coupler knuckle. Flanges are stiffened at outer ends by a 1¼-in. pipe nipple welded in place. Drilled holes accommodate the 1-in. by 15-in. steel locking pin which is turned over at the top and fits into an adjoining hole so it will not drop through. A set screw holds applicator on the fork. A hardwood block is driven in lightly to wedge the lock lift so coupler knuckle cannot open. The device is then secured with the coupler in a vertical position on the ground or platform. When the lift truck is available, the fork arm is inserted in the device and the set screw tightened. The coupler is then easily moved to the car and inserted in the coupler pocket. It is then ready for application of the coupler key, after which truck moves away.

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted by LMOA members, those sent to the Editor by other readers are welcomed and published.

Longer Oil Filter Life

Where can a lube-oil filter be obtained which will perform satisfactorily and also have longer life than those which are currently in use? What has experience proved about extended use of paper lube-oil filters?

Study of these two questions, which are both difficult to answer completely, suggests that the answer to one of them would seem to furnish basis for answer to the other. However, this would not necessarily cover all possible answers since the terms "extended use," satisfactory performance" and "longer life" are all subject to definition for an individual railroad. When the comparison with filters currently in use is also brought into the picture, this introduces some more variables and emphasizes the fact that we still do not have an accepted standard of quality either for paper or waste-packed filter elements.

Extended use of filters may mean many things to different railroads. Where filters have been customarily changed once a week, once every two weeks is extended use. But, to a railroad now changing filters on a monthly basis, such a move would not be too impressive. Probably the best approach is to consider extended use for one railroad at a time, which would mean a longer interval than has been customary for that railroad. It is likely that most railroads try to avoid complete filter failure and thus change filters while they are still usable. This is good practice. On such a basis, there is always room for some extension, but this should be done with a thorough understanding of the risks involved. It is easy to tell when a filter has been in service too long, but not possible to say how much too long with normal inspections.

The evaluation of effective filter life, which should also define satisfactory performance, will vary from one railroad to another. The purpose for the oil filter, in any case, is to remove insoluble material from the oil which, if left to accumulate, could cause or contribute to failure of the engine. The oil filter is an expendable item which costs money, but not nearly as much as the conditions it can alleviate. Effective filter life is the length of time, miles or other standard, that the filter can be used and still have the amount of insoluble materials in the oil below those amounts known to be harmful or potentially harmful to the engine powering the locomotive.

Assuming that we are dealing with comparable filter media in correctly designed systems which are operating properly, effective filter life depends upon:

- Ability of the engine to digest the fuel and send the exhaust products to their proper disposal point;
- Freedom from cooling-water leaks into the oil;
- Control of oxidation of the oil;
- Ability of the oil additive to control particle size of the contaminants that do have to be handled.

Organic Contaminants

If the oil does not carry organic contaminants of the size and amount which will clog or plaster the filter, then the filter will last much longer for the removal of dirt and other abrasive contaminants. In normal operation, the weight and volume of organic contaminants and their effect on filter plugging is many times that of the dirt and brake shoe dust which must be removed from the oil by the filter. Two of the primary requirements for extended filter life are an engine in good mechanical condition and fuel that can be burned clean. The other requirement is an oil which is stable to oxidation and contains an active dispersant additive. Since this additive is expendable, its ability to disperse the contaminants must be constantly monitored by laboratory examination.

This leads up to Cotton Belt experience with paper lube oil filters which has proved to us that, on our 1,600-hp Alco road switchers, filter-change intervals can be increased from once every two weeks, using waste-packed elements, to once every 60 days. This is done without detriment either to oil or engine, as far as can be determined. Test engines on this 60-day filter change interval for as long as ... months maintain acceptable oil insolubles and are clean. They have not experienced any difficulties traceable to oil filtration. Regular oil tests are performed for these engines to be sure that fuel dilution, water leaks and ability of the additive to disperse contaminants are under control. In performing these tests, oxidation is also kept under observation. If the dispersion reading of the oil drops below "Fair" the oil is changed. We believe that the use of such procedures as this has contributed much toward the success of this filter program. The complete discussion of this procedure can be found in the 1962 convention report of the Committee on Fuel and Lube Oil of the Locomotive Maintenance Officers Association.

Filter Changes

For our 2,400-hp Alco power, paper filter elements are changed at 15,000-mile intervals which has been found to allow a margin of safety in case the units can not receive filter changes exactly at this mileage. This is also true of EMD GP-20 units which use five paper and two waste-packed elements in the same housing. Tests have indicated a possibility of some extension, but the above-mentioned limits are feasible for the operation of this power; they allow a margin of safety. Again, oil-test procedures contribute to the success of this extended filter service.

The pleated paper lube-oil filter currently approved by the engine builder has performed in a satisfactory manner and has permitted the extension of filter-change interval on one class of power. These pleated paper elements are available through the engine builders as well as from several well-known suppliers of diesel-engine lube-oil filters.

T. A. Tennyson, engineer of tests, Cotton Belt.

'ete and the Parts Changer

By Ken Wright

)ne bright spring morning an auto-bile of uncertain vintage was roll- along taking Pete and three of his ociates to work. They had been wn much closer during the past ' years when their jobs had required m to service and repair mechanical :igerator cars and piggyback trail- . Each took pride in his work and ; never too proud to ask the assist- :e of his associates.

'Joe, when are you going to get rid :his wreck and get an automobile?" neone asked good naturedly.

'Oh, I don't know about that eck' business; I have had this thing ırt and back together so many times hink I know what it can and can't . That's more than I'd know if I got other car. It's not the prettiest thing the road, but it gets us there and :k. About the only trouble I ever 1 with it is occasional vapor lock the summer. If it does it a time or o, I change the fuel pump."

"What do you find wrong with the mp?" Pete asked.

"Nothing. I just throw it away."

"So you're one of those 'Parts ıangers.' Not really a mechanic, ıt change parts till you get some ıult, then quit. That can be an ex- nsive way of accomplishing things. 'en't you just a little curious about ıat is wrong with the pump?"

"Slightly, but I never seem to have ɛ time. Even if I did tear the pump ›wn and rebuild it, what assurance ould I have that it would be any tter? I'd have to build a test stand check its delivery rate. Just seeing at it pumped a little fuel when orked by hand wouldn't be conclu- 'e. The test would have to be so any strokes per minute, delivering so uch fuel at a certain pressure."

"Gosh, Joe, I didn't think you were thorough. And you're at least par- ılly right. While repairing one item a time can become expensive, work- g similar items in groups can lower e cost. That's where the 'Unit Ex- ıange' or 'Repair and Return' idea ›mes from. But when you're going throw the fuel pump away anyhow, think I'd tear it down and look at the ılves and diaphragm. A speck of dirt on one of the valves might be all that is wrong. Cleaning would enable you to get some more service."

By this time they had arrived at the shop. The discussion ended—temporarily; it would continue, possibly for days. Later in the morning, Joe approached Pete. "I've got a tough one; want to give me some suggestions?

"The refrigerator car I'm working has a '71 Series engine that won't start. I've tried just about everything."

"Wait a minute," said Pete; "give me the whole picture."

"I'm still thinking about that 'dig' you gave me this morning—calling me a 'Parts Changer.' Now maybe I've gone too far the other way. Nothing had been reported on this car. It was due for a fuel-filter change; I changed them. When I got ready to start the engine, it would crank but wouldn't start. It wouldn't develop any fuel pressure. Of course, the first thing I thought was that I'd 'goofed' in applying the suction or primary filter with a suction leak at the gasket. I took the filter down and checked the gasket. There was nothing wrong. I refilled the filter bowls, but it wouldn't pump."

"Wait a minute, Joe. Could this be a broken suction line in the tank? We've had that happen, you know. Where the suction line goes through the tank top, it cracks and may eventually break completely. When the tank is full, there's no problem. But let the fuel get down, and the system will start picking up air."

"That didn't escape me, Pete. I disconnected the suction and return lines and put them in a bucket of fuel, but still the pump wouldn't pick up any fuel."

While talking, they had walked to the car. "This is a relatively new engine," Pete said; "I can hardly believe the pump is defective even though your tests indicate it. How's that hose in the suction line—the one between the pump and the floor connection. The lining sometimes collapses, shutting off the suction. They may look good externally, but can be completely closed inside."

"That's a new one, Pete. I never heard of it. Let's take it off and see."

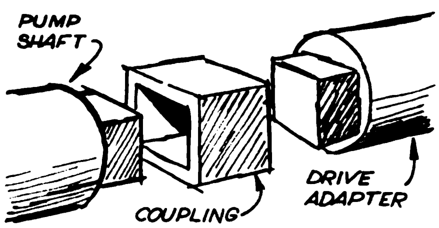
The hose was removed and examined. Although it appeared to be clear, they took no chance on a bit of loose lining acting like a check valve. After replacing it with a temporary copper tubing, the engine still would not pick up fuel from the bucket.

"Well, Joe, I guess we'll have to be Parts Changers for a while anyhow. You take the pump off and I'll get a new one. Let's get the car on its way and then find out what happened to the pump."

With the new pump in place, fuel was picked up immediately and the engine started. As the men then took the defective pump into the shop, Pete said: "Some time ago I had a car with simliar symptoms. When I took the pump down, I found that the coupling between the pump and the drive adapter was missing."

"You mean that little square bushing wasn't there; the coupling that fits over the two square shanks?"

"That's right," said Pete as he quickly sketched the parts.



"Wait a minute, Pete. You mean to tell me that you changed a pump and installed it without the coupling?"

"I didn't change the pump," answered Pete. "The car was loaded and had come in with the engine shut down. I found that it had run for about 14 hours after the pump was changed."

"Don't give me that stuff, Pete. How could the engine run if the pump wasn't coupled?"

"Believe it or not, Joe, the pump ran for 14 hours. Maybe not well, but it pumped fuel. Apparently there was enough contact between the ends of the pump shaft and the drive adapter that the pump could be driven. Finally it wore enough so that the frictional contact was lost and the pump stopped. Now what do you think could be the defect in this pump?"

"Well let's see. It is a positive-displacement, gear-type pump. That means the 'drive' gear must be secured to the drive shaft. It is secured with a ball which acts as a key, if my memory is right. If it is missing, there would be no way to propel the pump gears. The seal on the drive shaft

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is is the twentieth article in this series discuss- g the operation, maintenance and trouble ooting of mechanical refrigerator cars and ggyback trailers.

could be defective, allowing air to enter the pump. The pressure-relief valve could be stuck open."

"That's good, Joe. I always check the easy, simple things first. Which of these could be easiest to check?"

"The relief valve." Joe removed the plug on the side of the pump. The spring and guide pin were removed, but the piston-like valve would not come out of the pump body. It developed that the valve would not move either way. They finally removed the end cover of the pump. By using some solvent and a small round rod, the valve was finally loosened and removed. A dark gummy substance was found on and around the valve.

"It's funny that you didn't notice anything on the filters when you changed them," Pete remarked.

"Come to think of it, the filters did look dirty. I just assumed that someone had neglected to change them."

"Well, Joe, this could be a lesson. Don't assume anything. Those filter elements should have warned you to be looking for other fuel-system trouble. That engine will be lucky if it doesn't develop stuck injectors. This seems to be something that has gotten into the fuel. I think we can clean this valve and use the pump again. I know we should test it like you said, but at least we're not going to throw it away."

"Now, Pete. Anything I throw away will be my own property. I know this pump is a lot more expensive than an automobile fuel pump. But shouldn't it be overhauled and tested? It is a used pump."

"That's a good point, but I'd say the pump is relatively new and became defective only because of the gummy mess it was pumping. Get rid of the gum and it will be all right. If your judgment says 'overhaul it,' tag the pump for 'Repair and Return' and get it on its way."

"Isn't it funny, Pete, that there was no report of trouble on this car?"

"No, I don't think so. I don't think the relief valve actually stuck open until you tried to start the engine. Up to the time the engine was stopped, its heat kept the fuel and gum warm. When the engine was stopped and cooled off, the gum hardened. When the engine started turning over, the pressure of fuel opened the valve and it jammed open on the gun. I'm almost certain there was no prior trouble.

"Look at the time I've got to jump to get my own job done."

Personal Mention

A CORRECTION

ta Fe.—*Amarillo, Tex.:* L. L. LUTHEY ointed mechanical superintendent, West- Lines, succeeding A. J. HARTMAN, re- d. Our apologies to Mr. Hartman who, are happy to report, is retired, not de- sed as reported in our February issue.

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sapeake & Ohio—Baltimore & Ohio.—*ntington, W.Va.:* KENNETH T. REED ap- nted general manager—motive power equipment. Mr. Reed, who was chief chanical officer of the C&O at Richmond, , prior to the merger of the C&O and the O, began with the C&O in 1922 at Grand pids, Mich., where he became division erintendent in 1929. Subsequently, he general superintendent at Peru, Ind.; stant regional manager at Detroit; gen- l superintendent-transportation; assistant ional manager at Huntington, and assist- chief mechanical officer.

sapeake & Ohio.—*Huntington, W.Va.:* H. MANNING appointed chief mechanical cer, succeeding Kenneth T. Reed. Mr. nning, who holds a BS degree in me- nical engineering, started with the C&O 1934 and has held various positions in operating department. In 1960 he was pointed assistant to vice-president.

aware & Hudson.—*Watervliet, N.Y.:* W. TRAVIS, assistant superintendent of equip- nt, appointed superintendent of equip- nt, succeeding WILLIAM L. LENTZ, re- d.

Mr. Travis entered railroad service in 18 as an employee of the Delaware, Lack- anna & Western. He became head of the sel locomotive maintenance department 1956, continuing in that capacity when DL&W merged with the Erie. In 1961 became assistant superintendent of equip- nt of the D&H.

-Lackawanna.—*Cleveland, Ohio:* LAW- NCE E. SCHUETTE, superintendent car de- tment, retired. Position abolished. D. H. CKER appointed assistant chief mechani- officer—car. Mr. Decker formerly as- ant superintendent car department at anton, Pa. J. H. RAY, electrical engineer, pointed chief electrical engineer, succeed- GORDON E. MCKINNEY, retired. R. A. LIUS appointed electrical engineer. For- r position of assistant electrical engineer olished.

rocarril de Chihuahua al Pacifico.—*Chi- huahua, Chih.:* MANUEL VALLEJO MARQUEZ appointed general superintendent motive power and equipment.

Jersey Central.—*Elizabethport, N. J.:* B. J. DONESKI and T. W. GREEN appointed assistants to superintendent, motive power and rolling equipment.

Louisville & Nashville.—*Louisville, Ky.:* W. ALVIN GAINES, manager, mechanized equipment, retired.

Missouri Pacific.—*Houston, Tex.:* J. D. HOPE appointed master mechanic, Settegast Shop and DeQuincy division, succeeding E. G. WALL, retired. *Palestine, Tex.:* B. W. WIGGINS appointed master mechanic, Palestine division, succeeding Mr. Hope. *Poplar Bluff, Mo.:* L. BECHEL appointed master mechanic, Missouri division, Arkansas division (Little Rock Union Depot and Little Rock to Poplar Bluff) and Missouri Illinois Railroad, succeeding Mr. Wiggans. *St. Louis, Mo.:* J. W. MCCADDON appointed terminal master mechanic, St. Louis Terminal division, succeeding Mr. Bechel. *Kansas City, Mo.:* H. R. BURGE appointed terminal master mechanic, Kansas City Terminal division, succeeding Mr. McCaddon. R. W. DIAMOND appointed master mechanic, Eastern and Omaha divisions, succeeding Mr. Burge. *Kingsville, Tex.:* L. W. MARTIN appointed master mechanic, Kingsville division.

New York Central.—*New York:* H. G. WOLVEN appointed equipment supervisor—special freight cars. *Collinwood, Ohio:* M. E. TYDINGS appointed industrial engineering supervisor, Collinwood diesel-locomotive shop.

Norfolk & Western.—*Roanoke, Va.:* E. H. WERNER appointed assistant superintendent motive power—safety. W. A. GRIGG appointed electrical engineer, succeeding Mr. Werner.

Pennsylvania.—*Philadelphia, Pa.:* RICHARD E. FRANKLIN, newly appointed chief mechanical officer (RL&C, Feb., p 39), began railroad work with the Southern in 1937, advancing through the mechanical department as shop foreman, general foreman, master mechanic, and superintendent of mechanical equipment. In 1956, he became assistant vice president—mechanical. Subsequently he was in the employ of the Railway Maintenance Corp., and early last year became director, industrial engineering, for the Pennsylvania.

Southern.—*Washington, D.C.:* A. M. CARY, assistant chief mechanical officer, maintenance, locomotives, appointed assistant chief mechanical officer, diesel maintenance.

K. T. Reed
C&O-B&O

C. H. Manning
C&O

W. E. Travis
D&H

R. E. Franklin
PRR

Texas & Pacific.—*Big Spring, Tex.:* E. E. LONG appointed master mechanic, Ri Grande division. *Marshall, Tex.:* J. H WEBB appointed master mechanic, Re River division. *Fort Worth, Tex.:* H. M DOAN appointed terminal master mechani Dallas-Fort Worth Terminal division.

OBITUARY

Frank Kossuth, assistant general mechanic superintendent—car, New York Centra New York, died recently.

Letters

Adjustment Tool

TO THE EDITOR:

When using EMD's solenoid adjustme wrench 8174868, it is not always easy t get a screw driver blade into the adjustin

screw slot. The slot and the screw-driv blade cannot be seen. As a result, the blad has to find the slot by feel.

By grinding the screw-driver blade so tha a 1/32-in. projection is left at the center o the blade, the screw driver will find the sl as it is turned.

James Lillie,
Roseville, Cali

Voltage Regulator

TO THE EDITOR:

In the Model 101 voltage regulator descrip tion on page 10 of the January issue is typographical error. The last line shoul read: "Voltage is adjustable at any poi within the range of 69-79 volts" not 69-7 volts.

W. A. Melroy
Manager, New Product Developme
Thomas A. Edison Industries

Truck Symposium

TO THE EDITOR:

The January issue of Railway Locomotive and Cars contains an excellent report of th ASME Railroad Division, Symposium o Freight-Car Trucks.

I wish, however, to respectfully dra your attention to an error on page 37 of th issue where the initials of our chief mechan cal officer should correctly have been show as J. J. Miller. The confusion no doub arises from the fact that the present incum bent's predecessor was J. H. Miller who i now with Hanna Mining Co. in a consultin capacity.

J. A. Little,
General Manager,
Quebec North Shore & Labrado

Supply Trade

FFALO BRAKE BEAM CO.-UNIT JCK CORP.—*John C. Wende* transed to sales department.

RTER-WATERS CORP.—*Kenneth W. afort* appointed sales engineer, Railroad ision, at Kansas City, Mo.

NTRAL EQUIPMENT CO. — *E. E. p, Sr.*, retired GE transportation sales esentative, named to handle Central ts for railroads in Midwest.

ITCAST CORP.; WINE RAILWAY PLIANCE CO.—*Bruce E. Nevius*, sales iager, named vice president in charge sales, Unitcast steel castings division. *ille Ingram*, eastern district sales mana- appointed vice president in charge of s for Wine.

ARBORN CHEMICAL CO. — *George eck, Jr.*, appointed sales representative, tral States District.

IIELD BANTAM CO. — *Wallace J. ver*, chief engineer at Waverly, Iowa, inted head of newly created O.E.M. ginal Equipment Manufacturers) Sales artment in the Marketing Division.

RRELL MANUFACTURING CO. — *Hunter* of Frank B. Nugent Co., St. l, Minn., named representative for *Har- R. Bartell & Associates, Inc.*, handling ell mobile locomotive refuelers for rails in St. Paul-Minneapolis and Duluth s.

VNSEND CO.—*R. G. Luce* appointed ager, Technical sales and service, Enered Fasteners Division. *J. W. McCary* inted manager, general office sales, at ood City, Pa., succeeding Mr. Luce.

ATT BEARINGS DIV., GENERAL MO- CORP.—*A. D. Edelman*, assistant chief neer, appointed manager railroad enering at Harrison, N. J.

ANS PRODUCTS CO.—*Howard Mor-* appointed Chicago regional sales engi-, Railroad Equipment Operation. Mr. ris previously district representative assistant sales manager, Evans' Haskel-Division.

INDUSTRIES—*W. Howard Mowers*, vay sales engineer, transferred from York to San Francisco, Cal.

B. E. Nevius
Unitcast

O. Ingram
Wine

ARMCO STEEL CORP.—*J. G. Considine*, sales engineer, Metal Products Div., at Albany, N. Y., transferred to Baltimore, Md. *William F. Harrison* appointed a sales engineer, Cleveland, Ohio, area.

BRENCO, INC.—*W. Stuart Johnson* elected vice president—sales.

STANDARD FORGINGS CORP. — *John P. Lynch* appointed vice president—railway sales.

TIMKEN ROLLER BEARING CO.—*John F. Byrom* and *Glenn E. Neal*, assistant district managers, Railroad Division at Philadelphia, Pa., and Atlanta, Ga., respectively, promoted to district managers, with the same headquarters. *Neil B. Stark*, sales engineer, St. Louis, appointed assistant district manager there. *Jack R. Monday*, sales engineer, Atlanta, appointed assistant district manager there.

SELLERS INJECTOR CORP.—*James J. Polek* named eastern sales representative, covering New England, Eastern coastal states, and Tennessee.

NATIONAL CYLINDER GAS DIV., CHEMETRON CORP.—*Robert A. Baer*, manager, Railroad Equipment Department, appointed vice president of railroad services and equipment.

GENERAL AMERICAN TRANSPORTATION CORP.—*W. M. Roche* appo[...] general sales manager, Freight Car D[...] sion. *M. W. Burkhart* appointed dire[...] of sales, plastics division. *William W*[...] appointed district sales manager at Hou[...] Tex., succeeding *Robert P. Roark*, ret[...]

RAILROAD MATERIALS CORP.—*He*[...] *ry T. Fitzhugh* appointed southern re[...] sentative, with headquarters at 622[...] Road, Richmond 28, Va.

STANDARD RAILWAY EQUIPME[...] DIV., STANRAY CORP.—*Edwin T. Ric*[...] appointed sales representative.

W. T. COX CO.— Sales and manufact[...] facilities of Railway Sales Division now [...] cated at 580 Highway 54 West, Camden[...] Mo.

FREIGHTMASTER, A DIVISION OF HAL[...] BURTON CO.—*Paul D. Howard* appoin[...] sales manager. *Robert E. Abbott*, mecha[...] cal engineer, promoted to chief mechani[...] engineer. *Charles H. Bartlett* and *M. Ke*[...] *Bailey* appointed service engineers.

GOULD-NATIONAL BATTERIES, IN[...] INDUSTRIAL BATTERY DIV.—*P. R. Hea*[...] transferred from field engineering to sa[...] Pittsburgh, Pa., area.

SPEER CARBON CO., A DIVISION OF [...] REDUCTION CO.—*John Skok* appointed [...] field sales force, Carbon Products Di[...] servicing central Pennsylvania.

SPRAY PRODUCTS CORP.—*William* [...] appointed field manager.

C. T. Stansfield E. P. Kondra
Ellcon-National

J. S. Hutchins
ABS

A. E. Brown
Wyandotte

The above portraits are rerun becau[se of] their poor reproduction in the Februa[ry is]sue, page 40. *C. T. Stansfield* is chair[man] of the board, and *E. P. Kondra* presiden[t,] Ellcon-National. *J. S. Hutchins* is preside[nt] and chief operating officer of Americ[an] Brake Shoe Co. *A. E. Brown* is special re[p]resentative—railroads, J. B. Ford Div., W[y]andotte Chemicals Corp.

·port

(Continued from page 6)

= methods and promotion, Central of gia.

iteria for Automatic Rail Rapid Transit E. Wallace, General Electric Co.

Progress Report on Automation of oad and Rapid Transit Vehicles — [. Hines and J. R. Pier, Westinghouse 3rake Co.

cent European Railroad Developments n) — Charles E. Keevel, Chicago sit Authority.

rication Council ; Meeting Program

ng the April 30-May 2, 1963, annual ing of the American Society of Lubri- n Engineers at the Hotel Biltmore, York, the society's railroad group, the onal Railroad Lubrication Council, will a one-day meeting.

ıe railroad group will hold its annual ıess meeting on Thursday morning, 2, followed by its annual luncheon and :hnical session.

panel discussion of Lubrication of Cen- 'lates and Railroad Freight Equipment be presented, with keynote speakers be- G. H. Newcomer, director of mechan- research, AAR Research Department, W. K. Simpson, technical director fuels lubricants, Electro-Motive Division, eral Motors Corporation. John N. Crisp and Wells E. Ellis, Timken Roller Bearing Company, will present a paper on Low-Temperature Performance of Greases in Railway Roller Bearings. Lubrication of Freight-Car Air-Brake Equipment will be discussed by John B. Driver, AAR.

Diesel Hydraulics Start Eastern Test

A month-long test of diesel-hydraulic locomotives in freight service is now in progress on the New York Central. The pair of units involved are two of the three 4,000-hp Krauss-Maffei locomotives purchased by the Denver & Rio Grande Western in 1961. According to reports, the locomotives are being tested at various points on the NYC.

Shortly before the two units were shipped to the NYC, G. B. Aydelott, president of the D&RGW, in an interview with *Railway Age*, said: "We still consider these locomotives experimental. The three together will haul as much as six diesel-electrics.

"We have been giving these units the roughest, toughest treatment we can to test them thoroughly. Despite that, we have had no difficulty with the hydraulic drive in which we are especially interested. It has stood up well, and we think it has many possibilities. At high altitudes we have had some engine troubles which, I understand, the Southern Pacific has not encountered at lower elevations.

"We have had some maintenance problems," Mr. Aydelott continued. "Maintenance procedures seem to be pretty complicated. That may reflect the fact that the German builders are used to designing for government-owned railroads which can afford to dispatch locomotives. If they have to let the maintenance crew work on a unit for three of four days, that is all right. Here in the U.S. we have to dispatch trains. We want a locomotive in and out in 15 min if we have the freight to haul."

Mr. Aydelott stated that the D&RGW would definitely be interested in acquiring additional diesel-hydraulics "if we can lick the altitude problem and if an American builder would design a unit with simplified maintenance procedures. We still like diesel-electrics too. Just last year we bought 13 GP-30's from Electro-Motive and will be using a lot of diesel-electrics for a long time."

The D&RGW is currently spending $1.4 million on a new diesel shop at Burnham Yard in Denver. The shop, due for completion this year, will be a running repair facility and storehouse consolidated in a single structure adjacent to the present locomotive heavy repair shop. "It will increase our maintenance efficiency," said the D&RGW president, "giving us properly designed facilities by permitting consolidation and more effective use of shop forces and supervisory personnel, and by improving location, handling and flow of materials. Design and track layout will permit us to main' tain our locomotives on a production-line basis, with the end result of increased avail' ability at a lower maintenance cost level."

Trade Publications

(To obtain copies of publications, circle corresponding nu... on card following this page.)

19. MAINTENANCE GUIDE. Actual color standards for R... Oleum primer coatings for new, clean or rusted steel, also finish coatings, included in "Maintenance Guide for the Railro... Industry." Surface preparation and application procedures a... discussed. Rust-Oleum Corp.

20. HYDRAULIC DAMPERS. Comprehensive operation a... installation details of Armstrong line of telescopic and level ty... shock absorbers for rolling stock given in Publication SA... Load/Velocity Characteristics of both primary and secondary s... pension systems given. Armstrong Patents Co.

21. SOLVENT EMULSION CLEANER. Bulletin F-2469 d... scribes Wyandotte 468, a liquid cleaner and degreasing compou... for all forms of pressure-spray, steam, vat or hand cleaning to r... move heavy grease, oil and caked road soils from equipment, sh... floors, pits, etc. Wyandotte Chemicals Corp.

22. "MOISTURE CONTROL: COMPRESSED AIR." Revis... booklet includes data on engineering and operation of the Va... Air dryer and a discussion of moisture and contamination in co... pressed air. Van Products Co.

23. DUST PREVENTIVE COATING. Bulletin No. 3236 co... tains data on application and coverage of No-Ox-Id "E," its phy... cal characteristics, and removal methods. Dearborn Chemical C...

24. LOCK NUTS. Hints on how to select and use torque a... free-spinning lock nuts, weld nuts, flange nuts, cap nuts and oth... nuts and screws given in 20-page Lock Nut catalog. MacLea... Fogg Lock Nut Co.

Advertisers Index

VILL YOUR WHEELS TAKE THE OUGHER SERVICE COMING UP?

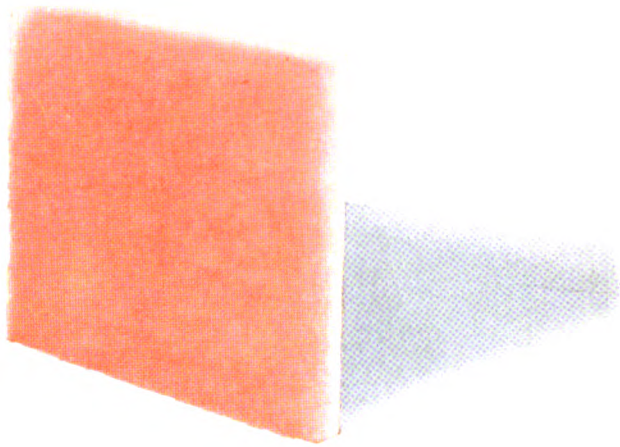
When you order a new freight car, the wheels you select could be one of the most critical parts of your purchase. If they won't hold up under the heavier loads and higher speeds of five . . . ten . . . fifteen years from now, scrap value is about all you will be able to salvage.

This is one important reason why some of the largest railroad systems purchase only wrought steel wheels. Wrought wheels have an unparalleled record of reliability in all kinds of freight service going back more than 50 years. In addition, since they are the standard for heavy diesel engines and fast passenger trains, they have proved performance under high loads and high speeds.

Other types of wheels have been in quantity production only about eight years, and not being approved for diesels and passenger cars, are untried in severe service.

The next time you order wheels, remember, *only* wrought steel wheels have a long record of service-proved reliability . . . a record to help you buy with confidence in their future performance. Write us for complete information on the advantages of Armco Wrought Steel Wheels. **Armco Division, Armco Steel Corporation, Dept. A-803, P. O. Box 600, Middletown, Ohio.**

ARMCO **Armco Division**



AILWAY
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nd Cars

APRIL 1963

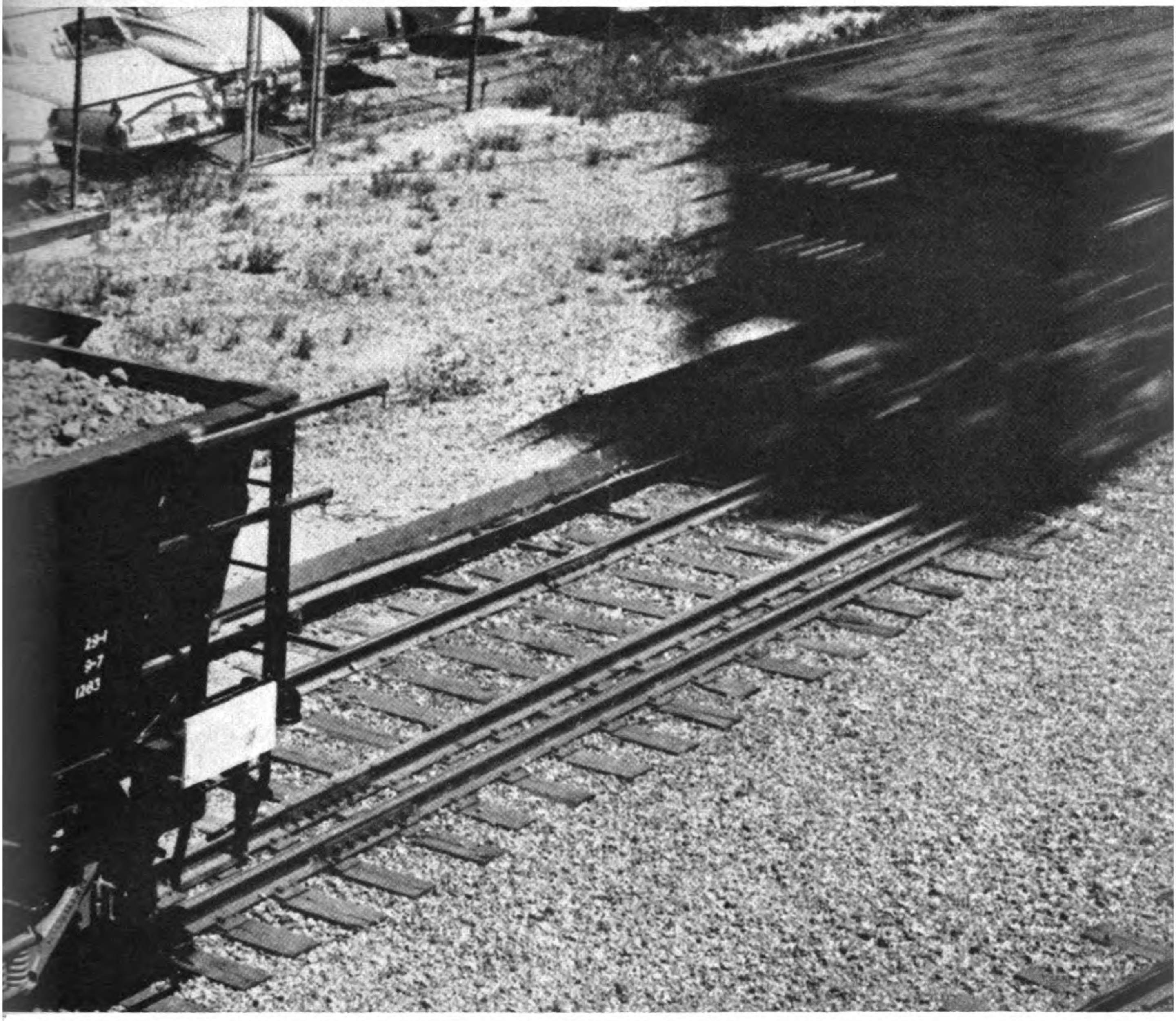
Seaboard Cuts the Failures of Traction-Motor Roller Bearings
page 26

A Simmons-Boardman TIME SAVER Publication

Burlington Shop Uses Foamed-in-Place Insulation

Page 19

)RTANT: EVEN AT TODAY'S 8-12 MPH COUPLING SPEEDS
IONAL RUBBER DRAFT GEARS HAVE RESERVE CUSHIONING CAPACITY...NEVER GO SOLID



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Get Extra Value in Extra Car Protection with Reserve Cushioning Capacity! Specify National MF-400A Rubber Draft Gears, particularly for bulk loading cars.

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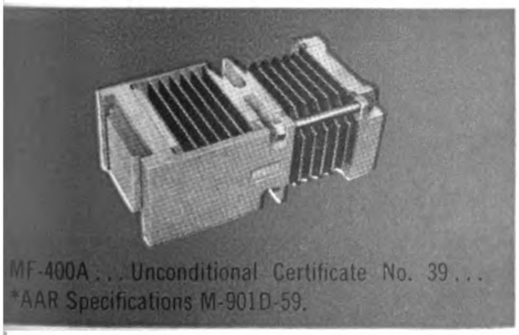

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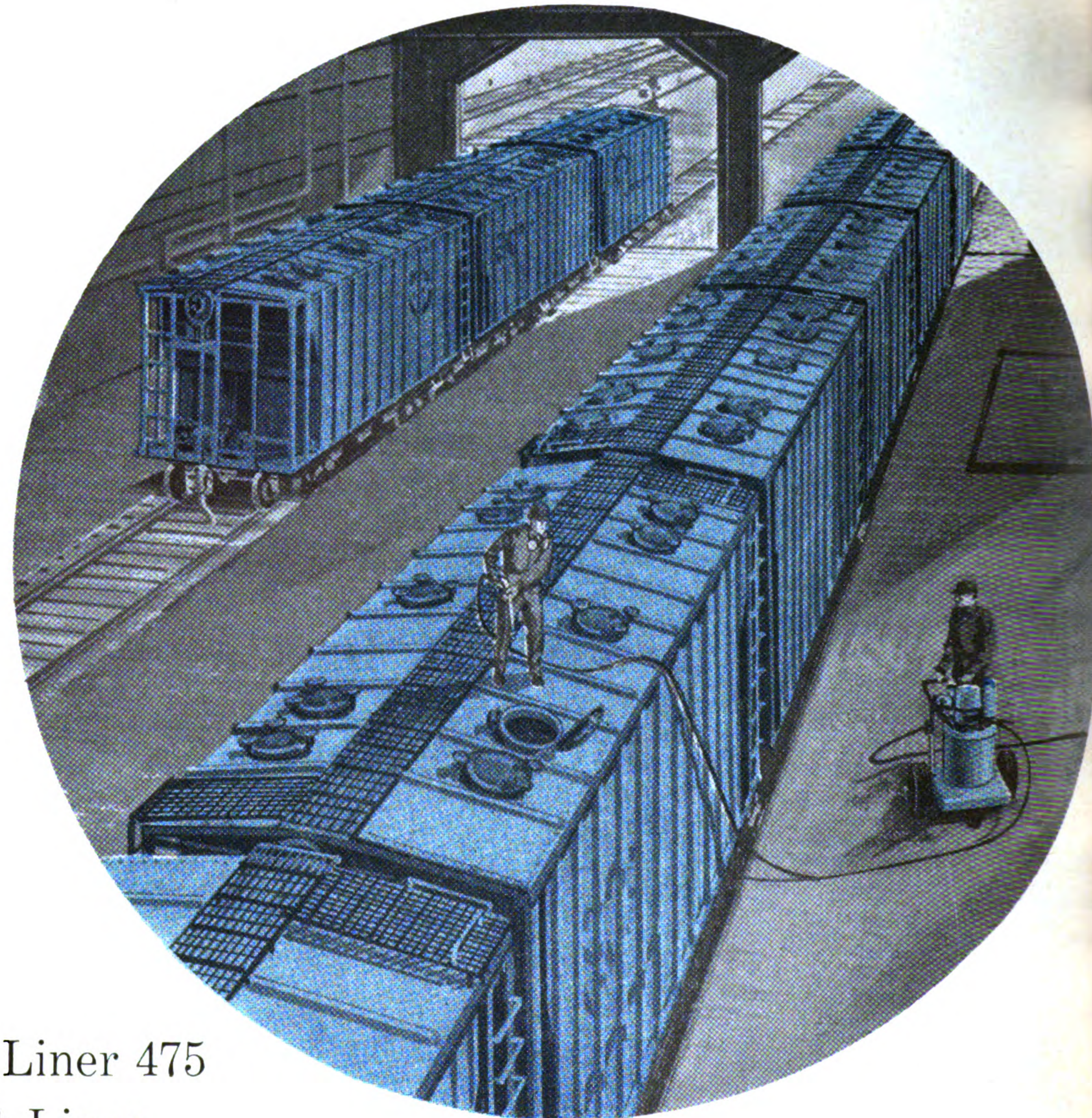

New
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This new FDA-approved epoxy coating for covered hopper cars cuts car lining labor in half. No primer. No second coat. No between-coat drying delays. *One* application of FREIGHT LINER 475 gives you a minimum of four to five mils coverage.

In covered hopper food cars, fumigants that meant instant death for insects also shortened the life of the car lining. But now, FREIGHT LINER 475 has exceptional resistance to fumigant chemicals and solvents . . . protects cars from corrosion, rust and abrasion . . . safeguards commodities from contamination.

FREIGHT LINER 475 sprays, and stays, smooth for clean load release. It comes in convenient two-compartment cans for quick and easy mixing . . . *without* thinning. For more information on how to cut your car-lining labor costs with new FREIGHT LINER 475, write ADM, Minneapolis.

Freight Liner 475

ADM CHEMICALS

ARCHER DANIELS MIDLAND COMPANY 733 MARQUETTE AVENUE MINNEAPOLIS 40, MINNESOTA

AILWAY

.ocomotives

nd Cars

America's Oldest Trade Paper
April, 1963—Vol. 137, No. 4

1E SAVING IDEAS FOR APRIL

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Report

More Orders, New Competition For Carbuilding Industry

The unexpected has characterized the 1963 carbuilding industry. There has been a sudden optimism about order prospects, sparked apparently by the response carriers are evidencing to the government's tax incentives and by anticipated traffic increases. Then last month the Missouri Pacific announced an order for 100 box cars which has been placed with a Mexican carbuilder —Constructura Nacional de Carros de Ferrocarril at Ciudad Sahagun, Hildago, Mexico. This is believed to be the first major car order placed outside the U.S. by a domestic railroad. (See Order table, p 6.)

Some U.S. suppliers are expected to participate in the order. MP's spokesman has indicated that certain appliances will be manufactured here, then exported to Mexico for installation.

In connection with the order, the MP pointed out that the railroad "has maintained close business relationships in Mexico for more than a half century . . . It is a principal transportation line both for the import and export of freight, and an increasing flow of commerce is moving between the U.S. and Mexico over the MP. In addition, the railroad operates a direct passenger service between St. Louis and Mexico in cooperation with the National Railways of Mexico. For these reasons, MP is pleased to participate in a modest way in helping further strengthen the economy of Mexico through the purchase of a portion of its freight cars in that nation."

While the impact of this new Mexican competition cannot yet be gauged, there is no doubt about the optimism which has pervaded the U.S. carbuilding industry. Department of Commerce economists are predicting that 50,000 new cars will go on the order books this year—a sharp upward revision of earlier, unofficial estimates that hovered around the 40,000 figure. Other forecasters, including some carbuilders, are looking for as many as 60,000 new cars.

Based on past performance, the Department of Commerce prediction may not be far from the mark. A year ago Commerce economists predicted that 1962 freight-car orders would be in the 37,000 range. The actual figure was 37,386.

Even if the '63 boom turns out to be one of comparatively modest proportions, it will be welcomed by the builders. The backlog of cars on order as of March 1 was 19,952, compared with 17,736 a year ago. Of this number, 10,785 were on the order books of commercial builders; the remainder were to be constructed in railroad shops. One hopeful note for the commercial builders: they will build 6,629 of the 10,074 cars ordered since January; railroad shops, only 3,445.

If the Commerce forecast of a 33% increase materializes, this will be the best year for carbuilders since 1959 when orders for 56,581 new cars were placed. On the enthusiastic side is ACF with its St. Louis shop booked solid through September.

Magor President F. J. Schroeder—whose

own prediction for 1963 is "40,000 if you're conservative; 60,000 if you're optimistic"—notes a trend toward larger orders of special-type cars. The railroad merger movement, plus new tax incentives, is spurring car buying, in Mr. Schroeder's view.

Greenville Steel Car's vice president-sales, G. C. Brecht, reports "bookings into the fourth quarter," adding: "We're jammed to the gills." Mr. Brecht sees encouraging signs that the peak-and-valley patterns of railroad buying are beginning to smooth out—hopefully, at a 60,000-car-a-year level.

R. C. Ortner, president of Ortner Freight Car Co., finds prospects "so good this year that there is just no comparison." The Ortner president attributes this to railroad managements' determination to win new traffic with cars tailored to shippers' needs.

Thrall reports dollar volume for the first fiscal quarter running "2½ to 3 times that of last year with a present order backlog of three to four months."

Bethlehem Steel finds the 1963 outlook "considerably better" than the year-ago picture, but still thinks 40,000 is "a good estimate of the business potential" for the industry as a whole.

The commercial carbuilding industry is still equipped to turn out many more cars than even the most enthusiastic are talking about. Pullman-Standard is turning out cars at Butler, Pa., at an average rate of 250 cars per month—but that's only 50% of capacity. Michigan City, Ind., which can turn out 1,000 cars a month at full capacity, is also at the 250-car level.

Orders and Inquiries for New Equipment

Placed Since Closing of March Issue

Locomotive Orders

CHICAGO & NORTH WESTERN.—*EMD:* 14 2,250-hp diesel-electric. Cost $2,637,500. For delivery this month.

MEXICAN NATIONAL.—*Montreal Locomotive Works:* 80 diesel-electric locomotives. Cost, $16.1 million. First units to be delivered this month.

UNION PACIFIC.—*General Electric:* 3 5,000-hp diesel-electric A units. For August delivery. *Alco:* 3 5,500-hp diesel-electric units (two A; one B). GE and Alco orders, reported unofficially, to have four-wheel trucks with span bolsters, similar to UP's 4,500-hp gas-turbine units. *Electro-Motive:* Also reported, unofficially, is an EMD proposed design of a 5,000-hp unit with single four-wheel trucks under each end, eliminating span bolsters.

SOUTHERN PACIFIC.—*Alco:* 3 4,300-hp diesel-hydraulic locomotives. For 1964 delivery.

Freight Car Orders

BANGOR & AROOSTOOK.—*Pacific Car & Fdry:* 50 50-ft 6-in. mechanical refrigerator cars equipped with cushion underframes, roller bearings and load dividers. Capacity, 3,845 cu ft. Cost, $1,479,480.

BURLINGTON.—*Pullman-Standard:* 190 covered hoppers, 140 of which will be equipped with the trough hatch. *ACF:* 10 "tear drop" covered hopper cars. Estimated cost of P-S and ACF cars, $2,742,800. Delivery to begin in June. *Bethlehem Steel:* 200 100-ton open-top hopper cars. Estimated cost, $2,363,800.

CENTRAL OF GEORGIA.—*General Steel Industries:* 15 53½-ft, 70-ton bulkhead flat cars equipped with one-piece, cast-steel underframes and interlocking cast-steel end posts. For second quarter delivery.

CHICAGO & NORTH WESTERN.—*General American:* 63 insulated box cars. Cost, approx. $1,157,000. For third quarter delivery.

CHICAGO GREAT WESTERN.—*Pullman-Standard:* 20 90-ton, 4,000-cu ft covered hopper cars. Delivered in March.

GREAT NORTHERN.—*Pullman-Standard:* 30 4,000-cu ft capacity, 100-ton PS-2 center dump covered hoppers. For delivery in June. *General Steel Industries:* 10 60-ft, 70-ton nominal capacity, and 30 53½-ft, 90-ton nominal-capacity flat cars equipped with roller bearings and hydraulic draft gear. For delivery in July. *Company shops:* 500 50-ft, 70-ton box cars. To be built during second and third quarters of 1963. *ACF:* 25 4,000-cu ft capacity, 70-ton aluminum Center Flow cars. For third quarter delivery. *International Car:* 20 30-ft all-steel cabooses. For early fourth quarter delivery.

FRISCO.—*ACF:* 75 70-ton box cars with roller bearings, cushion underframes, and plug doors. For third quarter delivery. *General American:* 65 50½-ft, 70-ton insulated box cars equipped with movable bulkheads cushion underframes and roller bearings. For third quarter delivery. 15 70-ton Airslide cars with roller bearings. Capacity, 2,600 cu ft. For July delivery.

ILLINOIS CENTRAL.—*Company shops:* 150 70-ton insulated box cars. Cost, approx. $2,500,000. For May delivery.

LOUISVILLE & NASHVILLE.—*General American:* 30 70-ton, 2,600-cu ft Airslide covered hopper cars. For July delivery. *Pullman-Standard:* 100 100-ton, 2,600-cu ft trough-hatch covered hopper cars. For July delivery. *Pullman-Standard:* 100 trough-hatch covered hopper cars. For May delivery. 71 70-ton flat cars equipped with cushion underframes and 21 70-ton flat cars equipped with cushion underframes and bi-level racks. For May delivery. 100 70-ton bulkhead flat cars. For delivery this month. *Thrall Car:* 25 100-ton bulkhead flat cars. For May delivery. *Ortner:* 50 100-ton open-top hopper cars.

MISSOURI PACIFIC.—*Constructura Nacional de Carros de Ferrocaril:* 100 70-ton, 50½-ft general service cars. Cost, approx. $1 million. Cars will be plain box, with no special fittings or components. All will be built with wood lining and wood flooring and equipped with 9-ft sliding doors. The units are part of road's previously announced 1,770-car program for 1963. This order believed to be the first major car order ever placed by a U.S. road with a foreign carbuilder. The Mexican firm is located at Ciudad Sahagun, Hildalgo, Mexico. *ACF:* 20 89-ft flat cars, equipped with multi-level racks. Cost of flat cars, $310,000; racks, $150,000.

NORTHERN PACIFIC.—*Pullman-Standard:* 15 100-ton, 4,000-cu ft covered hopper cars. Cost, approx. $225,000. For May delivery.

SANTA FE.—*Pullman-Standard:* 300 100-ton, 4,000-cu-ft, center-discharge covered hopper cars equipped with roller bearings. Included are 25 cars with 40-ft trough hatch. Delivery to begin this month.

Notes and Inquiries

The *Chicago Transit Authority* has requested bids on 180 "New Look" rapid transit cars estimated to cost about $15 million. The cars, to be of steel, stainless steel, or steel and aluminum, will replace 200 cars that are about 50 years old, and will be operated in sets of two, permanently coupled. Each car will weigh 45,000 lb without air-conditioning equipment on which alternate bids are being requested, and will have four 100-hp motors rated at 65 mph. Trucks will have rubber and steel springs and shock absorbers. Heating and ventilating system will be similar to system developed for CTA's latest buses. Delivery of the new cars to be completed 17 months after contract is signed.

The *Metropolitan Transit Authority*, out of its planned $200 million program of rapid transit improvements for Greater Boston, would allot $40 million for cars. The 10-year plan is dependent upon federal aid.

The *Norfolk Southern* plans to acquire 17 new diesel-electric locomotives at a cost of $2,975,000. Road has applied to ICC for federal-government guaranty of a $5,400,000 loan to partly finance the locomotives.

Port-Authority Trans-Hudson Corp. bids for 250 new rapid-transit cars (RL&C, Dec. 1962, p 7) have been returned unopened by the Port of New York Authority, in the wake of a court decision holding unconstitutional the legislation under which the PNYA operates the former Hudson & Manhattan Railroad (Hudson Tubes). Manufacturers whose proposals were affected are Pullman-Standard, Budd, St. Louis Car, Grumman Aircraft Engineering Corp., and Hitachi New York—the latter presumably acting for the Japanese carbuilding firm, Hitachi, Ltd.

The *Rock Island* has authorized the purchase of 12 road diesel locomotives and 50 85-ft flat cars. Cost, $3 million.

The *Wabash*, during 1963, will overhaul at its Decatur, Ill., shops 2,416 freight cars, including 1,300 40-ft, 60-ton box cars; 700 70-ton hopper cars; 400 70-ton, 52½-ft gondola cars, and 16 new-type steel stock cars. Auto racks will be installed on 30 bi-level cars, and 100 new, 70-ton, 50-ft insulated box cars will be placed in service.

ASME-IEEE RR Conference To Consider Mass Transit

Mass transit will be stressed in man[y of] the discussions scheduled for the fifth [...] Railroad Conference to be held in At[lanta,] Ga., on April 25 and 26. Sponsored [an]nually for the past few years by [the] American Society of Mechanical Engin[eers] and the Institute of Electrical and E[lec]tronic Engineers (and its predece[ssor] American Institute of Electrical Engine[ers]) these technical Railroad Conferences [have] steadily gained popularity.

All sessions of the 1963 Conference [are] to be held at the Atlanta Biltmore, [with] the first sessions scheduled to begin at [...] a.m. on Thursday, April 25. Subjects [of] opening-day papers are: A Family of V[...] Transit Systems; New and Ultra Mo[dern] Concept of Rapid Transit Design; The M[ag]netic Road — A new Form of Transp[ort;] Environmental Testing for Transit Ap[pli]cations; A Space Age Drive for Ra[pid] Transit Cars; Investigation of Jour[nal] Finish on Traction Motor Support Bea[r]ings. Speaker at the luncheon on this [day] will be D. W. Brosnan, president of [the] Southern.

Subjects of the papers to be presen[ted] on Friday, April 26, are: Performance T[...] of Long-Travel Cushion Underframes; [...] Electrical System on Krauss-Maffei Die[sel-]Hydraulic Locomotives; Some Signifi[cant] Diesel-Electric Locomotive Repair [...] Trends; Criteria for Automatic Rail R[apid] Transit; A Progress Report on Autom[ation] of Railroad and Rapid Transit Vehic[les;] Recent European Railroad Developments (Film). L. Aikman, columnist for the At[]lanta Constitution and the Atlanta Journal will be the luncheon speaker on this d[ay].

More details concerning the Conferen[ce] and the authors of the papers appear [on] page 6 of the March issue of Rail[way] Locomotives and Cars.

Truck Design Code Is Published

An AAR Code to indicate design features [of] side frames and truck bolsters having b[uilt-]in snubbing devices is now available. Th[e] two-section code book is in loose leaf form. The first section contains the system [for] assigning code numbers to standard side frame and bolster designs of the Ride Con[]trol, Cushion-Ride, National C-1 and Barber S-2 freight car trucks. A code number designates interchangeable design features. Truck manufacturers have cast code num[]bers, when applicable, on side frames and bolsters produced since Jan. 1, 1962. Re[]commended spring groups for these trucks are included in the first section.

The second section contains tabulation of manufacturers' designs which were [fur]nished prior to Jan. 1, 1962 without AAR code number markings on the castings. [A] code number is shown for each design. Th[is] section also explains each manufacturer's method of marking castings and a pattern numbering system so the design may [be] properly identified.

The Mechanical Division suggests [the] Code book be made available to Purch[asing] and Stores personnel responsible for [...]

(Continued on page 43)

One of the truly unique railroads in America today is the Portland Zoo Railway (PZR) in Portland, Oregon. Launched in 1957 by men who know and love railroads, the project was built entirely with donations and the volunteer labor of thousands of Oregonians.

The PZR is a half-size system consisting of 26 units of rolling stock. Running on 2 miles of track, the units are made up into 5 trains—a 4-car diesel streamliner, an 1870 diamond-stack locomotive, a circus train, a work train and a fire train.

High on the list of items used by the PZR to constantly maintain itself as an efficient railway system is Oakite 202 for washing power units and cars. PZR officials and maintenance men of many of the nation's leading railroads were quick to recognize that the remarkable soil-dissolving and loosening ability of Oakite 202 assures effective cleaning with a minimum of time and effort. They saw for themselves that while Oakite 202 really goes after tough 'road soils, it is exceedingly kind to paint and metals.

Call your Oakite man for an on-the-spot demonstration of Oakite 202. Or send for free brochure F-10696 to Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

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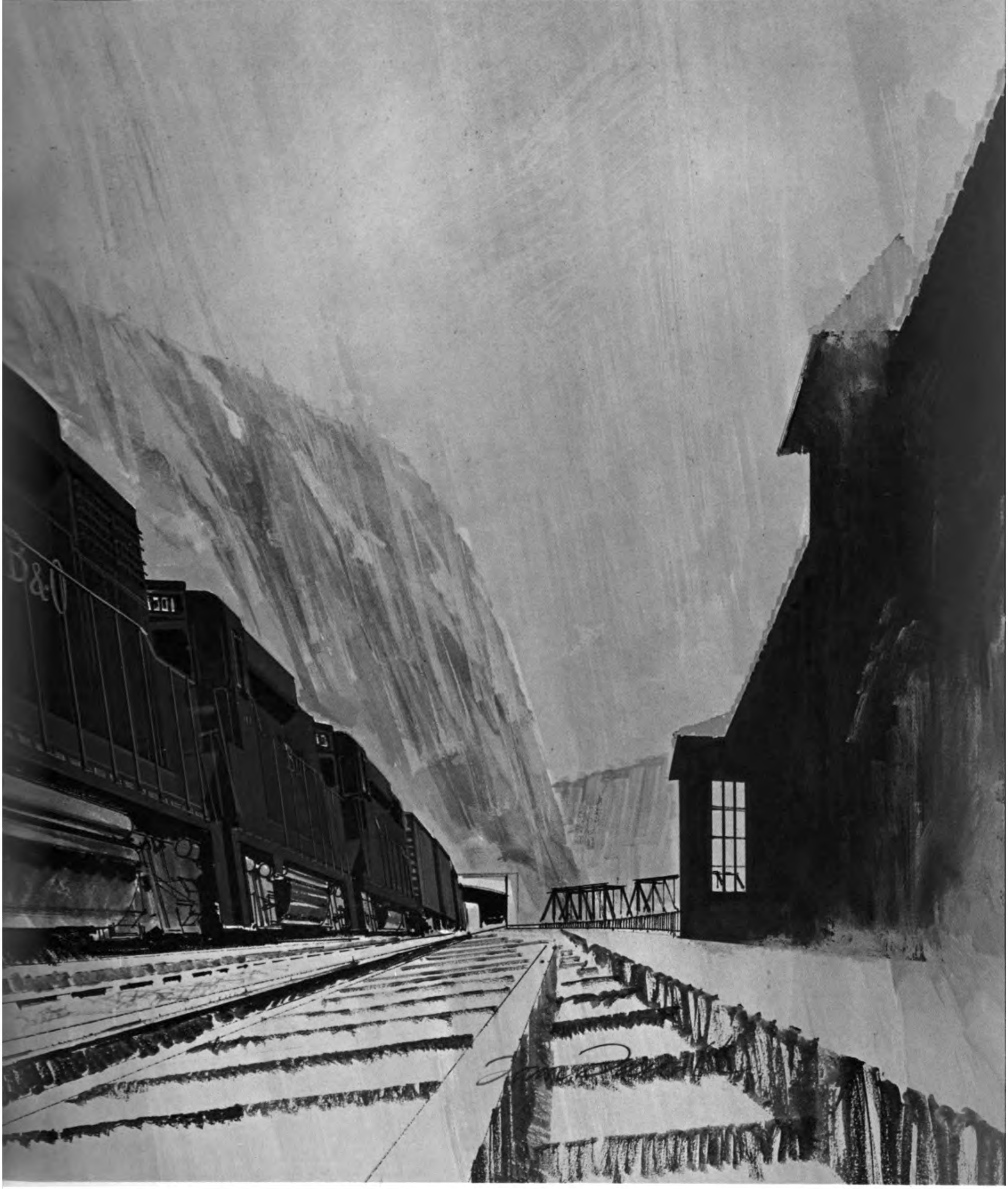
OAKITE®

over 50 years' leadership in industrial cleaning
Est. 1909
SCIENCE

On the B&O . . .
the Revolutionary GP-30

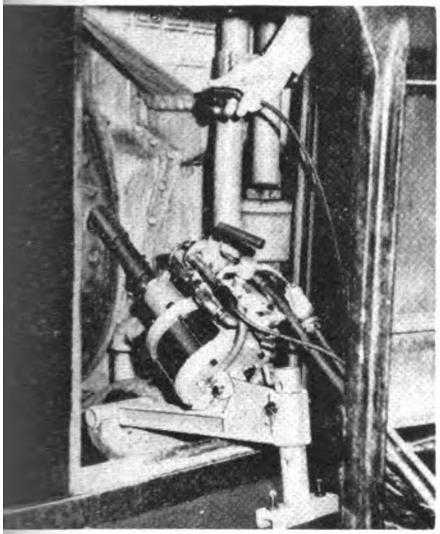


From out of the morning mist of Harper's Ferry comes THE CHICAGOAN, Baltimore and Ohio Railroad's newest high speed freight train. Up front on THE CHICAGOAN and on other B&O fast freights are General Motors new broad range GP-30 Diesel locomotives. The seventy-seven 2250 hp GP-30s the B&O has purchased to replace older Diesel power in its fleet will move more gross ton-miles per freight train hour, at lower operating cost, than ever before. The B&O takes giant strides in railroad progress with creative planning and the revolutionary GP-30.

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS · LA GRANGE, ILLINOIS

HOME OF THE DIESEL LOCOMOTIVE · In Canada: General Motors Diesel Limited, London, Ontario

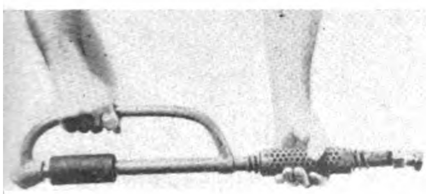
What's New in Equipment



)iesel Cranking

)ne man can inspect the power assemblies ıf EMD 567 series diesel engines by using ın electric and air-powered Crankjack. The :ranking device is remotely controlled by ›ush-button from any place along either ide of the engine. It is used primarily for nspections, engine timing, and generator naintenance. In some locomotive models, he unit anchors in the existing cradle used or manual cranking of the engine. Other nodels have anchor adaptors. The crank- ack, which weighs approximately 45 lb, s positioned in the anchoring bracket, with he drive arm located in a bar-hole on the lywheel. The unit is then connected to a ource of compressed air and to the 64-volt ocomotive electrical system. The air source ›rovides the necessary power; electricity is he means of control. A converter is avail- ıble for 110-120-volt a-c current appli- :ations. B. K. Sweeney Mfg. Co.

For more information, circle 4-1 on card 'ollowing page 50.



Cleaning Tool

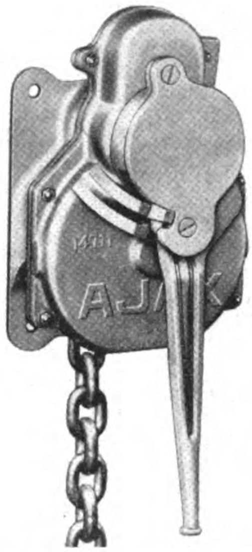
By turning air-cooled grip of the Kool Swivel Lance, angled nozzle can be rotated 360 deg for the discharge of hot cleaning liquids. The lance is 25 in. long, about half the length of regular models. It is particularly suited for use in areas where equipment is concentrated in relatively restricted space. Sellers Injector Corp.

For more information, circle 4-2 on card following page 50.

Flooring Tile

Hypalon, a du Pont product, is combined with other resilient flooring raw materials to produce Vistelle Corlon tile for pedestal flooring and railroad cars. It is said to have superior resistance to chemicals, stains, and burns. Indentations made by stiletto heels "recover within 24 hr." The flooring is manufactured in ⅛-in. gauge in tile sizes 9 x 9 in. and 12 x 12 in. and is available in ten colors. Armstrong Cork Co.

For more information, circle 4-3 on card following page 50.



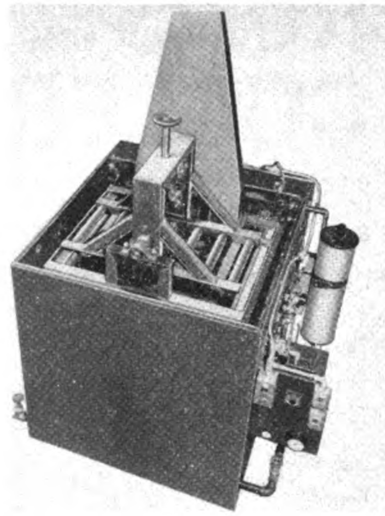
Hand Brake

Quick take-up, one-hand operation, and a flat profile, which allows maximum clearances, feature the Ajax pump-handle hand brake. The brake mounts within sides of drop-end gondolas for safe operation and is adapted for use on piggyback cars. The corner post mounting gives the brakeman a clear view. Internal parts are cadmium plated and diochromated to protect from rust and corrosion. The off-on lever is weighted for easy movement. Ajax-Consolidated Co.

For more information, circle 4-4 on card following page 50.

Rotating Cleaner

A vertically oscillating, horizontally rotating motion features the pneumatically operated Agi-Roto cleaner developed for cleaning heavy equipment such as cylinder blocks and large and bulky castings. The part to be cleaned is rolled onto a roller-equipped work rack and locked into position. At the press of a button the work rack lowers and rotates at 4 rpm. A three-way, hand-operated valve starts the rack agitating in 3- to 6-in. strokes at from 10 to 60 strokes per



min. Fresh cleaning solution is constantly surged through remote areas and crevices. For accelerated cleaning action, steam heating immersion type coils may be had. The cleaner may be equipped with a filtering system for full-cycle, continuous operation. National Ultrasonic Corp.

For more information, circle 4-5 on card following page 50.

Blast-Cleaning Agent

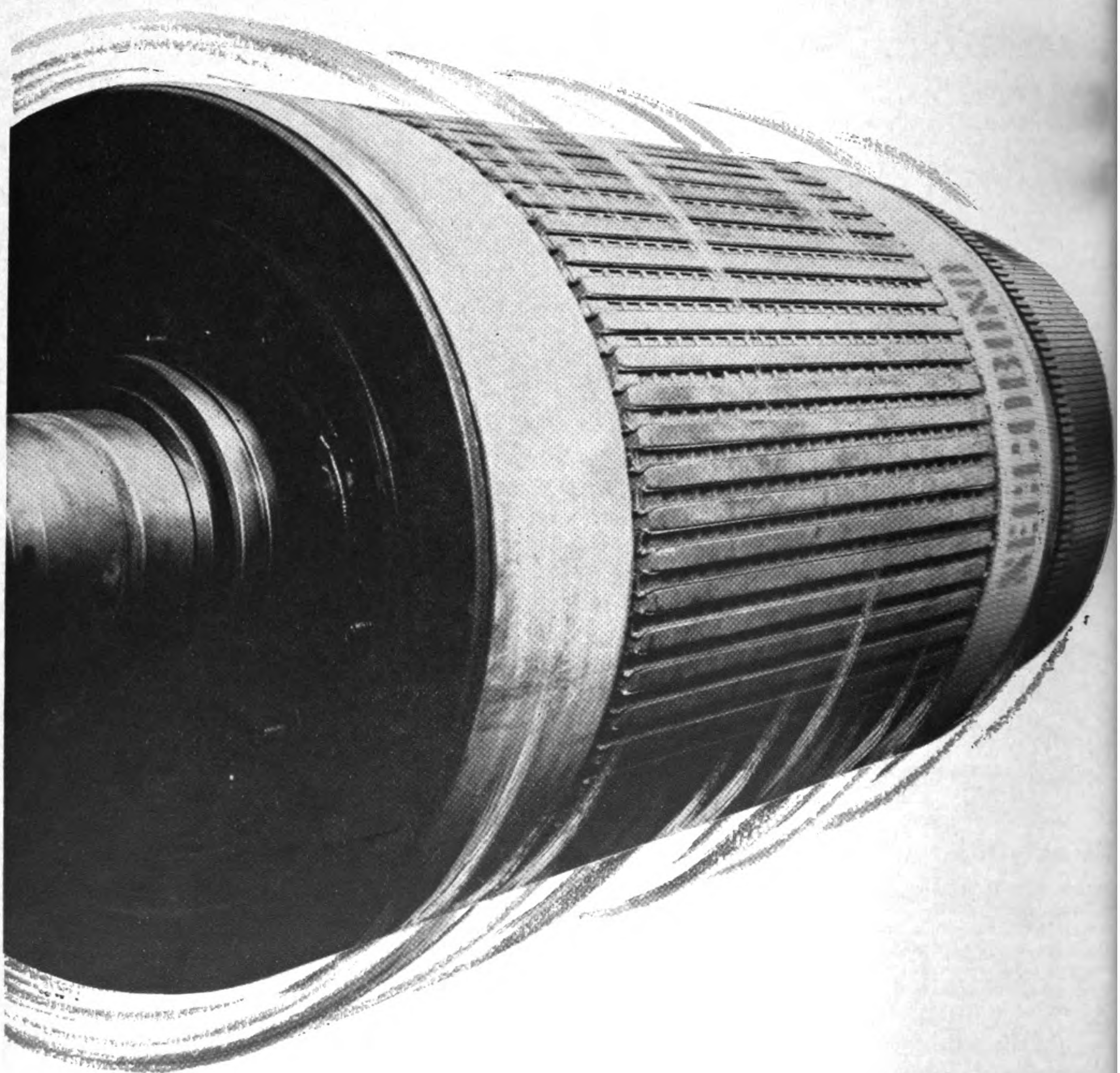
Cab-O-Brade, a garnet material with abrading characteristics superior to sand and other materials, is a blast-cleaning agent for tanks and similar metal parts. It has an Moh hardness factor of seven, a specific gravity of 3.7, and is produced in four grades to meet all surface requirements. It is also used as a skid-proof agent for ramps and decks. Cabot Corp.

For more information, circle 4-6 on card following page 50.

Airless Spray Units

A circulated-heat airless spray unit, consisting of an airless pump and dual 2,000-watt electric heaters, is arranged to siphon fluid directly from original container, pump it through a filter to the heaters, and then through a hose to the airless gun. Unused fluid is returned to the pump for recirculation. The pump is double acting, air oper-

(Continued on page 14)



. . . two reasons that make CLEVITE BEARINGS best for EMD replacement

Clevite now offers you a *four layer* bearing, available for the first time for EMD main and rod bearing replacement. Typical of the quality that has made Clevite the world's largest manufacturer of large engine bearings, this bearing for EMD replacement is outstanding for two reasons:

1 The patented nickel barrier prevents tin migration from the overlay, giving the bearing a far higher resistance to scuffing and corrosion.

2 The patented lead-tin-copper overlay contains 3% copper. This carefully controlled percentage of copper actually increases the overlay fatigue strength to 5 times that of conventional bearings with no copper in the overlay.

These two reasons—greater strength and longer life—can be the final answer to your replacement bearing requirements for EMD. For further information, write to Cleveland Graphite Bronze, division of Clevite Corporation, 17000 St. Clair Avenue, Cleveland 10, Ohio. In Canada: Clevite Ltd., 1177 Talbot, St. Thomas, Ontario.

CLEVITE
CORPORATION

What's New

(Continued from page 11)

ated, with a 30 to 1 ratio. It can deliver 90 gal per hr maximum and supply discharge pressures ranging from 450 to 2,500 lb per sq in. Temperature range with an adjustable thermostat is 100 to 200 deg F. Heaters operate on 50- to 60-cycle, 230-volt, single phase a-c. Base- or cart-mounted units are available. Binks Manufacturing Co.

For more information, circle 4-7 on card following page 50.

Incinerating Toilet

The Model GC Incinolet is a gas-fired, waterless incinerating toilet designed specifically for use in cabooses. The unit is of stainless-steel and nickel-alloy and requires only 75 watts electrical power. Heat is applied by radiation, which encloses the flame within a high-temperature combustion chamber. Odors are drawn into the flame and oxidized. Butane or propane produces heat at 12,000 Btu per hr. Research Products Manufacturing Co.

For more information, circle 4-8 on card following page 50.

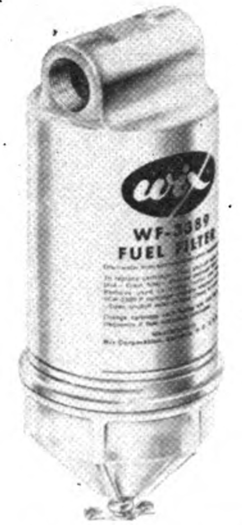
Industrial Fastener

Two separately placed chemicals in the Jay-Lok industrial fastener react when mixed during the assembly of the bolt and nut. The "cured" chemicals adhere both to the bolt and nut threads 24 hr after assembly, producing a chemically bonded unit which is said to be two to three times stronger than required by military specifications. The locked threads are resistant to acids, alkalies, moisture, and many other organic solvents. Screw & Bolt Corp. of America.

For more information, circle 4-9 on card following page 50.

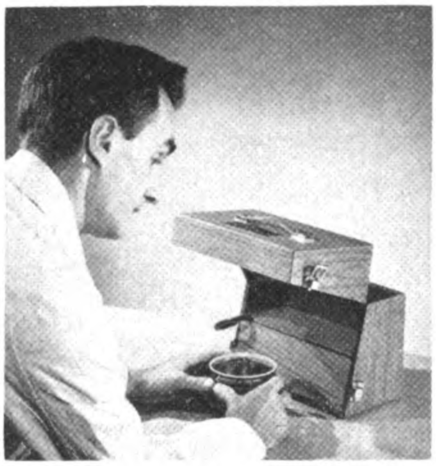
Fuel Filter

The WF-3389 water-trap filter for filtration of gasoline and diesel fuel where shutdowns through contamination or presence of moisture are major problems, consists of a rust-proof aluminum body, base threaded to a polystyrene sediment bowl and sealed with an O-ring. A wing-nut drains water from the bowl without disturbing the filter. The



filter cartridge is changed by removing the bowl. The pleated Porosite element of the cartridge has 380 sq. in. of filtering surface. Filter change is not required more than twice yearly, except under severe service, according to the manufacturer. Wix Corp.

For more information, circle 4-10 on card following page 50.



Portable Light

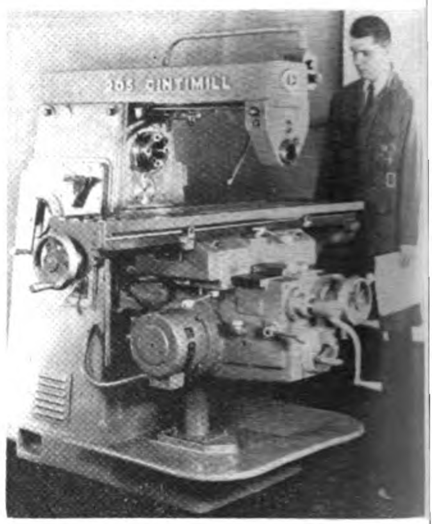
The redesigned Lapmaster Monochromatic Light measures surface flatness to within .000001 or .000002 in. on lapped parts up to 6 in. diameter. A helium lamp of known wave length casts a strong glare-free light that produces readily observable light and dark bands on most reflective or semi-reflective surfaces. The light is 6½ in. deep, 10¼ in. wide, and 7 in. high. It weighs 15 lb. The UL approved transformer operates on standard 110-volt, 60-cycle current. Crane Packing Co.

For more information, circle 4-11 on card following page 50.

Hose Covering

As an option to regular compounds, Chemivic—a special compound which is said to have high resistance to weathering, abrasion, and fuel reaction—is being used in oil-suction and discharge hose covers. The compound is a formulation of Chemigum synthetic rubber and vinyl resins. In sand-blast tests for abrasion resistance, the manufacturer says, it has outlasted by three times other compounds. Goodyear.

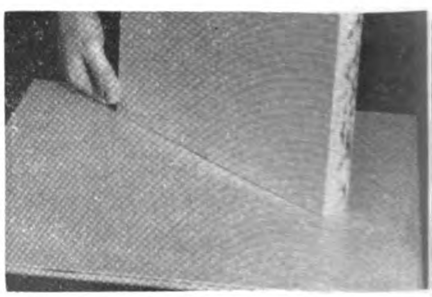
For more information, circle 4-12 on card following page 50.



Milling Machine

A 5-hp main motor operates the knee and column type Cintimill designed for tool-rooms, maintenance shops, and small lot production operations. Spindle speeds are variable from 40 to 1,800 rpm; table and cross feeds range from ½ to 30 ipm. and elevation feed range is from ¼ to 15 ipm. Start-stop pushbutton control is mounted on swivel pendant that swings to both sides and front of the machine. Manual feed is through handwheels with spinning type handles. Cincinnati Lathe & Tool Co.

For more information, circle 4-13 on card following page 50.



Lining Material

Molding polyester fiber-glass surfaces directly to plywood has produced a new car lining material. Thicknesses range from ¼ to 1 in. The plywood is sandwiched between two layers of fiber-glass surfacing, either .015 or .030 in. thick, the rear layer preventing warpage and increasing impact resistance. Tests of the material show an average no-break impact of 25 ft-lb. Westinghouse Electric Corp.

For more information, circle 4-14 on card following page 50.

(TURN TO PAGE 45)

Editorials

Big Power for Big Jobs

Diesel-electric locomotive design is currently in the direction of units twice the capacity of available production models.

We are not sure what sparked this move to the 5,000- or more horsepower per unit design. It could be the 4,000-hp diesel-hydraulic locomotive's performance that showed the way when three of these units could do the work of seven diesel-electrics. It could be that railroads need and are demanding fewer and more powerful units to meet their operating requirements in a highly competitive transportation industry.

The use of fewer and more powerful units seems the logical reason for the design trend. When five to fifteen units are needed to deliver the horsepower essential to produce the fast service required to keep priority freight traffic on the rails then it is about time to search for a more economical solution for this motive power assignment. When from ten to fifteen units are needed to deliver the tractive effort for the movement of "integral" coal trains that require a fast turnaround and high utilization of equipment to be profitable at the lower freight rates, then the railroads should be interested in locomotives designed for the job.

Only one railroad has been unofficially reported to have ordered the two 5,000 or more horsepower diesel-electric designs. If the new units were to be utilized by only one railroad then information on them would be of little more than academic interest to other railroads. We believe, however, that there is a need for these models by many roads and we assume that the builders are counting on a substantial market for their new products. If this analysis is correct it is probable that many railroad men are interested in the designs, both operating personnel concerned about what they can do and mechanical departments with the responsibility of maintaining them. Dimensions and weights of these larger, more powerful units could very well require changes in existing maintenance facilities and alter plans for new shops and terminals.

Available information on the new designs, also from an unofficial source, indicates that the new designs will have two four-wheel trucks at each end with span bolsters transmitting the cab load. In this respect they will be similar in wheel arrangement to the 4,500-hp gas-turbine locomotives on the Union Pacific. It is assumed that each unit will have two engines and two generators with each engine-generator set supplying the electrical energy for only the traction motors under one end. This arrangement would be similar to the diesel-hydraulic units which have two independent power plants and transmissions.

In a sense motive power history is repeating itself. Steam locomotive design progressed from the 2-4-0 through the 2-8-0 Consolidation to the 2-10-2 Santa Fe types and up through the 4-8-8-4 articulated "Big Boy" designs as railroads searched for more power in one package. Diesel-electric design has not been required to follow a similar development pattern because multiple-unit operation permitted railroads to vary locomotive horsepower and retain a single head-end crew. Yet maintenance economies inherent in having fewer locomotive units, fewer inspections and less paper work should be attractive to most railroads.

During the diesel-electric locomotive's development and almost complete dieselization by the railroads, the designs have been dictated by the builders, who have done an outstanding job in keeping costs under control through production methods. It is possible that new designs, such as these high-horsepower models, will be aimed at meeting the railroads' requirements.

We would like to know more about them because we are sure that all mechanical department men want to be informed of the new motive power designs they may be required to maintain.

The October Exposition

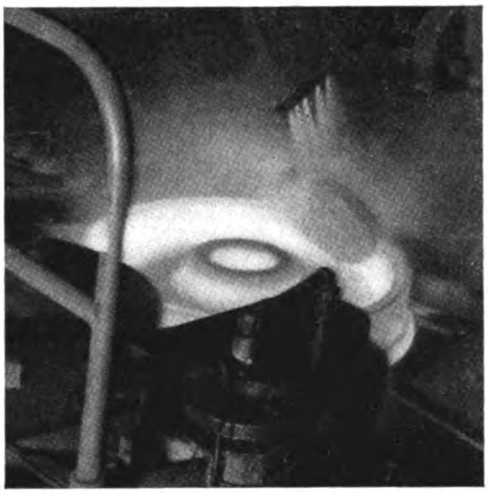
Now is the time to plan for attendance at the consolidated meetings and exhibits to be held October 9-16, inclusive, at Chicago.

About 250 companies have already signed up to display their products at either the indoor McCormick Place exhibit space or the outdoor track exhibit space.

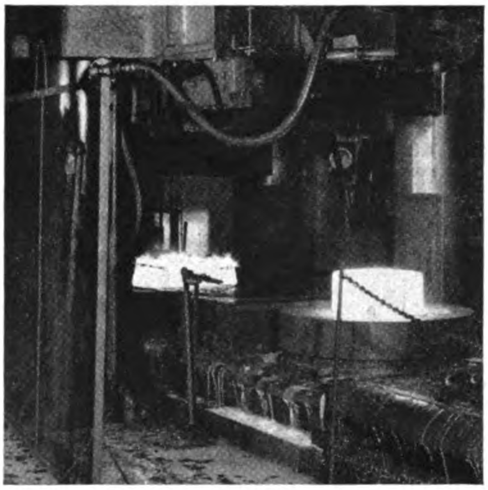
Mechanical department men will be interested in details of the meetings of the AAR Mechanical Division and the Coordinated group which include the Air Brake, Car Department Officers, Locomotive Maintenance Officers and Railway Fuel and Operating Officers associations. Both the Mechanical Division and the Coordinated associations will hold their meetings at McCormick Place, both will use the Morrison Hotel as headquarters. The Mechanical Division annual membership meeting is scheduled for Friday, October 11. The Coordinated meetings are scheduled for Monday, October 14 through Wednesday morning, October 16.

Because the exposition is scheduled late in the year the Mechanical Division is holding a limited business meeting on June 25 and 26 at Chicago in order to transact its business and publish the new Interchange Rules on time.

All details of the big show and the meetings have not yet been completed but this publication will keep its readers informed of the exposition plans. The tentative program for all meetings to be held during the full October 9-16 period will be carried in our May issue. We will, of course, publish the schedule of committee reports for the Coordinated associations and the Mechanical Division program after this information becomes available.



Forging and rolling Armco Wrought Steel Wheels refines the cast structure, provides added strength and toughness.



Why Armco Wrought Steel Wheels Take Tougher Service

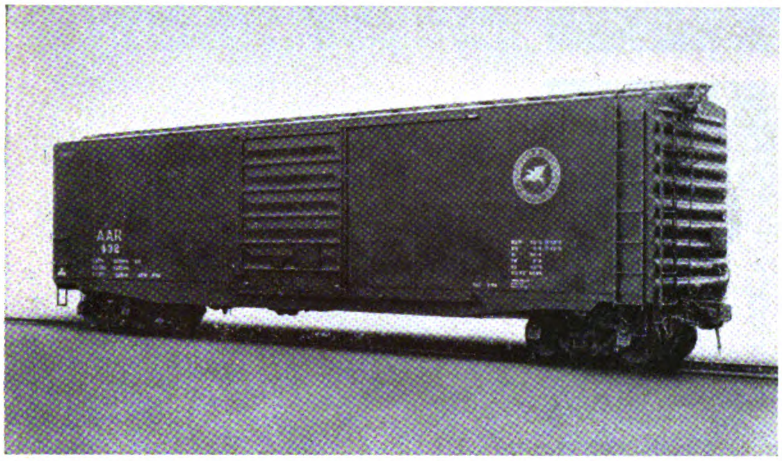
The trend in freight hauling continues toward higher speeds and heavier loads, putting more stress on wheels. This is why it pays to equip your cars with service-proved wrought steel wheels.

No other kind of wheel has a 31-year record of dependable service under all types of conditions. No other kind of wheel is used on heavy diesel engines or high speed passenger cars. Wrought steel wheels will take more rugged service because forging and rolling give them added strength and toughness. The coarse cast structure is refined and kneaded into homogeneous, void-free metal. Wrought steel wheels also are lighter than cast wheels.

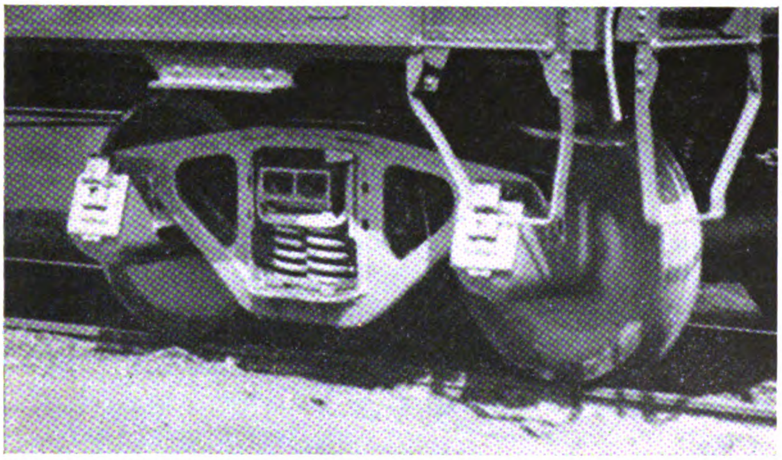
You can specify Armco Wrought Steel Wheels with confidence in their performance. For complete information, contact your nearby Armco Sales Office or write **Armco Division, Armco Steel Corporation, Dept. A-1143, P. O. Box 600, Middletown, Ohio.**

ARMCO **Armco Division**

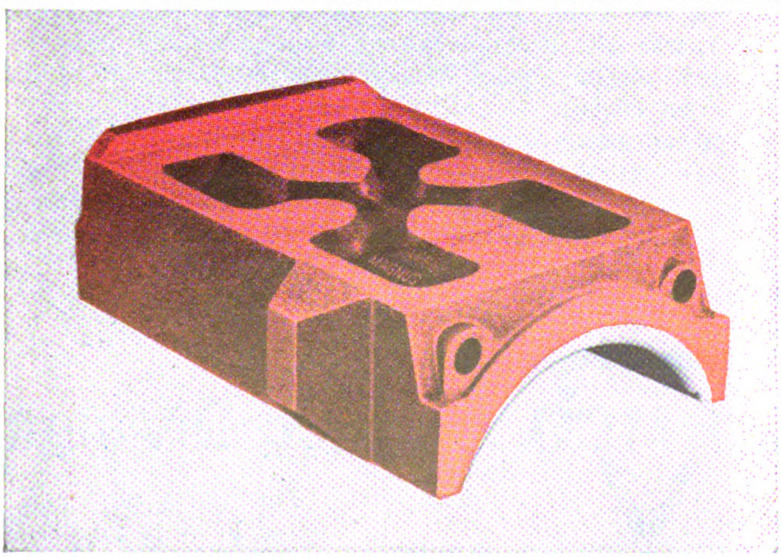
You save **$700,000 ON EACH 1000-CAR PURCHASE** when cars are solid-bearing-equipped—or you get up to 8% more cars, more hauling capacity for the same initial car investment.



Solid bearing cars **AVERAGE OVER 50 CAR YEARS PER HOT BOX**—current records indicate more than 850,000 car miles per set-out, an improvement of better than 300% in three years since 1959.



It will cost you **$11.85 LESS TO OWN AND OPERATE** each solid bearing car, than just to <u>own</u> a roller bearing car—based on current solid bearing operating costs of only $40.86 per car per year.



With **NEW MAGNUS FLAT-BACK BEARINGS,** these costs will be EVEN LOWER—with performance that promises to hit 2,000,000 car miles per hot box. For complete facts on journal-stabilizing flat backs, write Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

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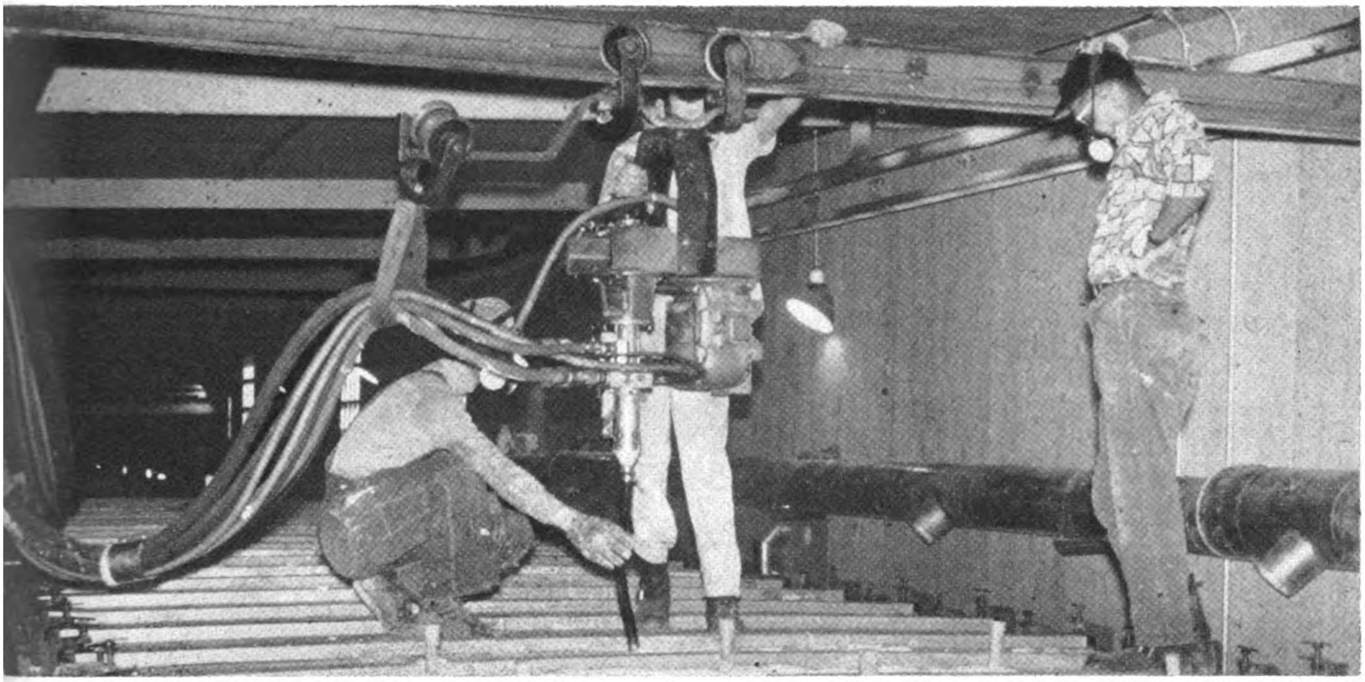


Foaming of roof is done through holes drilled in wax-coated forms. When urethane expands through hole, a wooden plug is driven to close it.

Applying Foamed-in-Place Insulation

Burlington shop has separate building and special equipment for putting highly efficient insulation in new freight cars

A production line for foamed-in-place insulating of freight cars, believed by the Burlington to be the first in the railroad industry, has recently been placed in operation at the road's Havelock car shop in Lincoln, Neb. First cars to receive the polyurethane foam insulation were 100 RBL bunkerless 50-ft, 70-ton cars. The same insulation will be applied to an additional 150 RBL cars scheduled to be started this month and to 100 50-ft mechanical refrigerator cars which are to be built later. Special machines and production-line techniques for mixing and applying foam materials were devised by technicians of the railroad and the Sterling Refrigeration & Engineering Co., Omaha, Neb.

In announcing completion of the first 100 of the \$19,000 RBL cars, Burlington officers pointed out that foamed-in-place insulation is twice as efficient as conventional insulation. This would mean, in a refrigerator car, that desired temperatures can be maintained with less heating or cooling energy. The insulation will not absorb moisture. Foamed cars are also stronger and more rigid, which should give them longer life and reduce the number of trips they make to repair shops.

Eleven chemicals form the quasi-prepolymer, polyether-based, Freon-blown foam. Foam is produced by reacting certain catalysts and emulsifiers with Freon and polyether plastic resin. The material is mixed and applied to the car sides, ends, and floor. As it is poured into the insulation void, an exothermic chemical reaction takes place with liquid Freon changing to gas, starting the foaming process. When the material has reached maximum foam expansion, the continuing chemical reaction causes the material to solidify. During the reaction, foam fills each crack and crevice, permanently sealing the insulation void against moisture and air infiltration. Since the insulation is a completely enclosed cell and each cell contains Freon gas, it is impervious to moisture absorption or transmission. The material will not support combustion, is nonporous and provides a completely airtight, waterproof car.

The K factor of the insulation is rated at about 0.12 to 0.14 Btu per hr per sq ft per inch thickness per degree of temperature difference—much lower than that of more conventional

materials previously used in refrigerator cars.

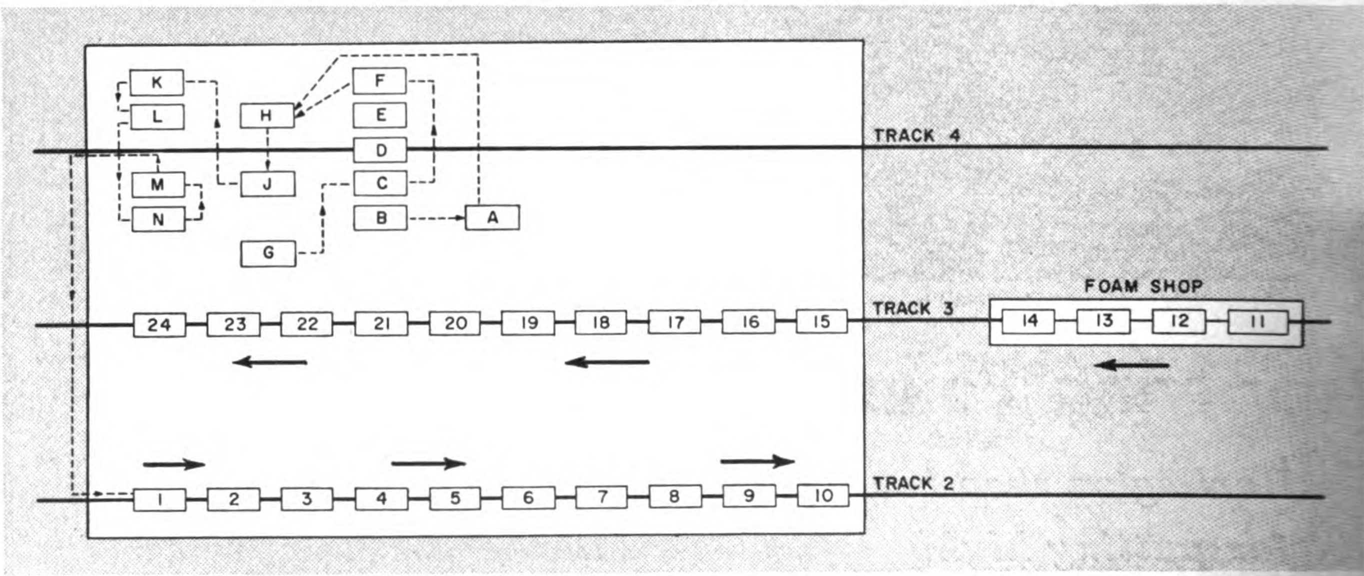
Adhesive qualities of the foam both to steel and wood are described as excellent. Values are approximately 45 psi, providing an adhesive bond between exterior steel sides and interior wood lining of the car. The material will not sag or settle with car movement and will retain effectiveness throughout the life of the car. Since all wood parts used in the car are completely encapsulated within the foam, they retain their structural strength and are waterproof.

Burlington and Sterling combined forces in 1958 to experiment with polyurethane foam for railroad use after H. C. Murphy, Burlington president, agreed the substance warranted investigation. A refrigerator car, MNX 2389, and ten trailers were foamed, using crude, hand-made machinery. The condition of all these after four years' hard usage convinced Mr. Murphy of the merits of polyurethane; he promptly authorized construction of a production line for foam - insulating cars at Havelock shop.

In February 1959, experiments at the test facilities of Fruit Growers Express Co. at Alexandria, Va., found the heat transmission rate (U factor) of MNX 2389 to be 83.4 Btu per degree per hour at a temperature differential of 100.8 deg F. In December 1962, almost four years later, the test was again made after this car had handled many different types of loads. The U factor was found to be 86.1 Btu/deg/hr at 99.9 deg F temperature differential, substantially the same as in 1959 soon after the polyurethane insulation was applied. Inspection showed the insulation to be in good condition and firmly bonded to the car's lining and sheathing.

Following authorization of the 100 RBL cars, Sterling engineers worked with the Burlington to invent machines, fixtures and mass-production techniques needed for the job. A four-station foam shop was built. It had

Assembly Line for RB Cars at Havelock Shop



Underframe Assembly

Station

A. Assemble carbody underframe, including sub-center sill, crossbearers and bolster diaphragm; ream and drive crossbearers and bolster diaphragm to sub-center sill. Apply and weld bottom bolster cover plate.
B. Shape side sill.
C. Assemble castings with sliding sill.
D. Weld sliding sill in turnover fixture.
E. Ream striker and keyway in sliding sill.
F. Rivet castings in sill.
G. Complete welding of sliding sill.
H. Apply sliding sill to inverted underframe.
J. Ream bottom of underframe.
K. Rivet bottom of underframe.
L. Ream top of underframe.
M. Rivet top of underframe.
N. Complete welding of underframe.

Underframe is mounted on trucks between Stations L and M and moved outside; six floor stringers are placed; underframe moved to Station 1.

Car Assembly

Station

1. **Weld floor stringers in place; apply floor** plates over top of underframe; apply brake equipment brackets.
2. Hang and ream two-piece car ends and one-piece sides.
3. Apply safety appliances; ream sides and corner posts.
4. Drive rivets in ends and corner posts; apply hand-brake assembly.
5. Rivet end and side sills, door-post gussets, safety appliances, threshold plates and crossbearers at side sills.
6. Apply piping, brake rods, angle cocks and brake equipment.
7. Complete welding of floor plates; apply longitudinal wood floor stringers with weld studs.
8. Complete stringer installation; weld carline angle brackets and install wood carlines.
9. Apply wood furring posts to sides and ends; install fillers on ends.
10. Test air; apply placard boards, release valve, retainer valve and piping; install ceiling.

Car moved outside; exterior washed with mineral spirits; a red prime coat sprayed.

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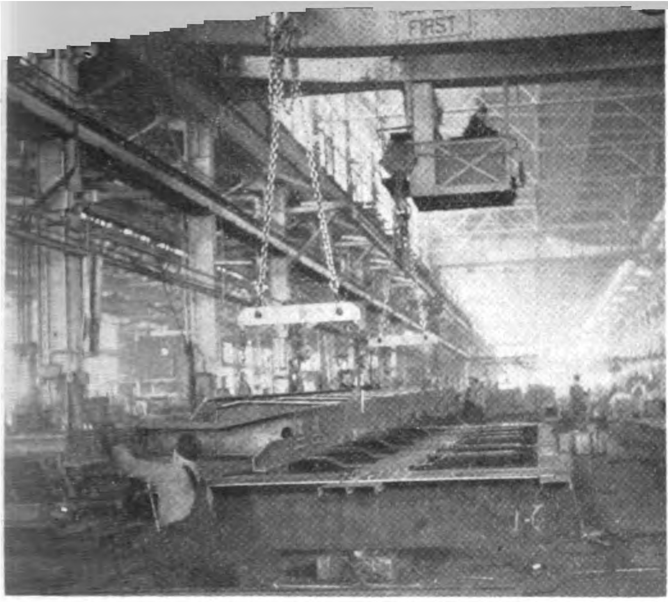
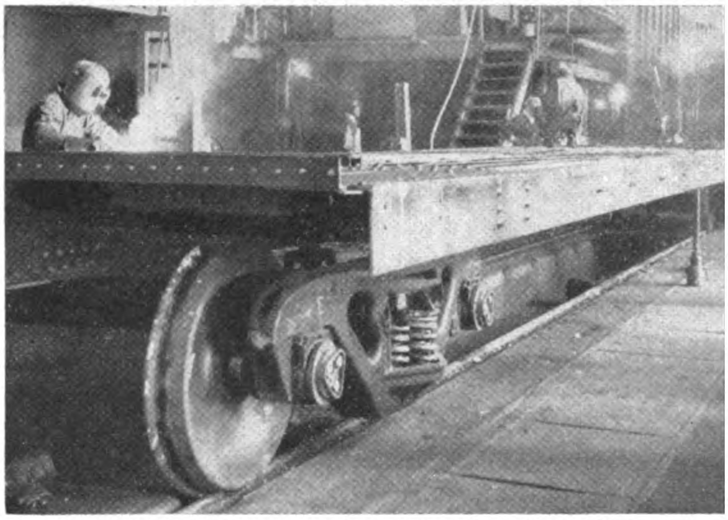
11. **Preheating**
12. Side and end insulation
13. Floor insulation
14. Roof insulation
15. Remove floor and side forms; clean and rewax them.
16. Apply load-divider bottom track and Doweloc floor.
17. Apply doorway fillers and staple end lining.
18. Apply weld studs to door-post fillers; install brackets for top load-divider track.
19. Install top load-divider track.
20. Hand load dividers.
21. Apply steel straps to car sides for installation of permanent side fillers; trim foam on roof before applying roof panels.
22. Apply side fillers; adjust clearance of load dividers; apply 15 roof sections, seam caps and running-board saddles.
23. Install monogram boards and steel threshold plates; rivet seam caps and running-board saddles; apply running boards.
24. Apply bottom door tracks and plug doors; adjust doors.

Car moved outside of shop. Exterior washed with mineral spirits; interior of car cleaned. Car then moved to paint building and to track scales.



Two portions of underframe are assembled; sliding sill goes on next.

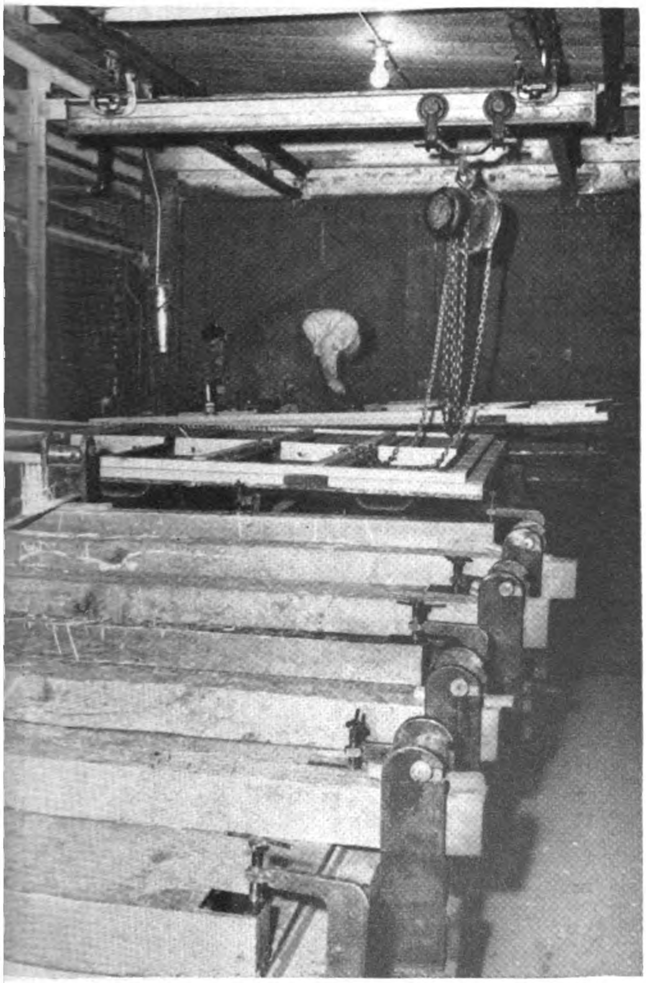


Plates welded to underframe at Station 1 form base for insulation.

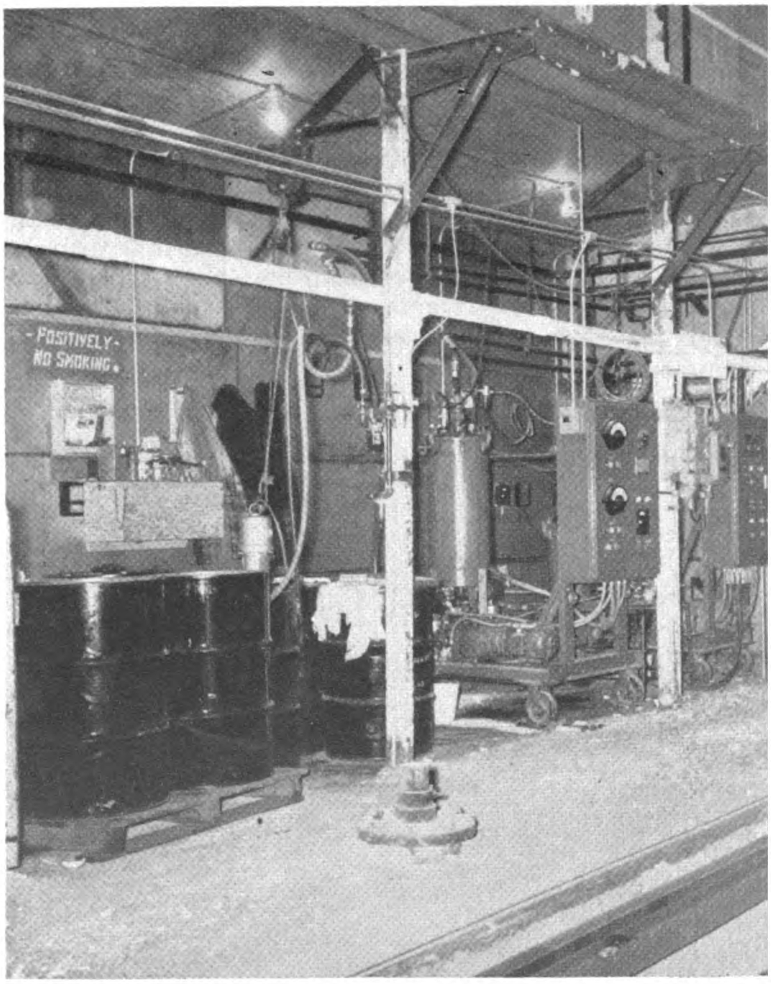
special heating equipment to keep the building at an ideal foaming temperature of 85 deg, even if 20 deg below outside, and a battery of high-capacity ventilating fans to carry off chemical fumes. Cars are ideally foamed at a temperature of plus 80 deg F because the foaming chemicals are more easily controlled at this temperature. The resulting insulation possesses a more uniform cell structure which is necessary to good foam insulation.

First of the four 50-ft stations in the foam house is used for heating a car for two or more hours after it is brought in from the outside. In the succeeding three stations, the floor, the sides and ends and, finally, the roof are foamed.

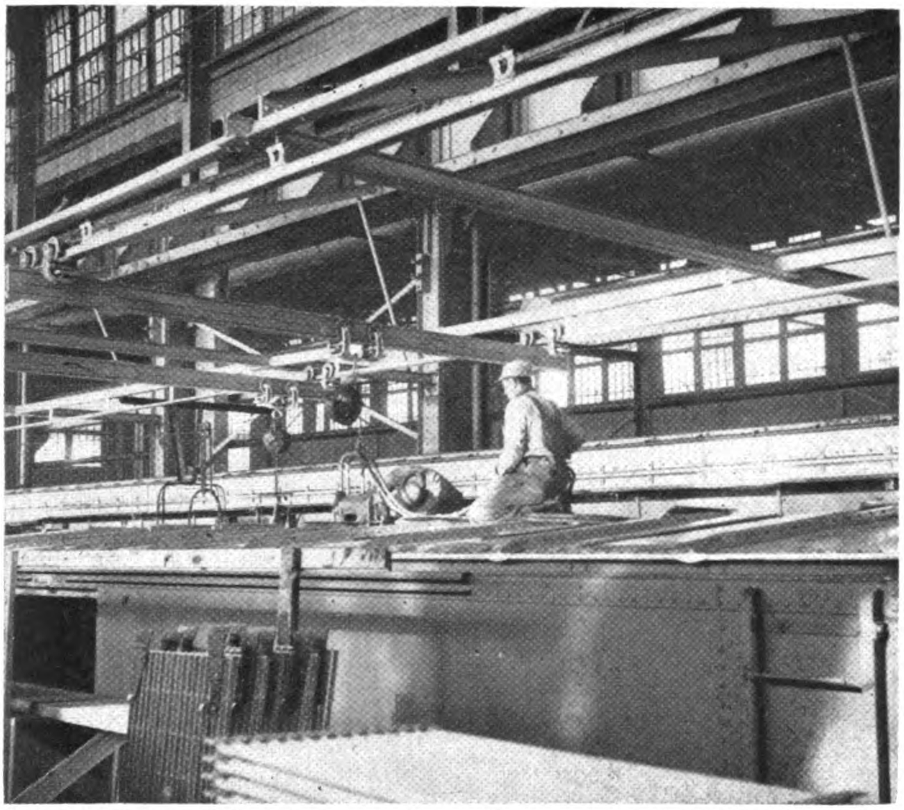
The foam material-handling equipment was built by Martin J. Sweet Co., Louisville, Ky. It had been designed by Mr. Sweet and F. J. Schaaf of Sterling. Burlington men, trained by Sterl-



Doors are foamed separately and are clamped during the process to resist pressure developed by release of the Freon in polyurethane.



Pumps and control equipment in foam shop make possible continuous circulation of resin and prepolymer in the separate piping systems used.



Annealed rivets are cold driven in seam caps in one of last stages of roof application which is done only after the top of carbody has been foamed and special forms removed.

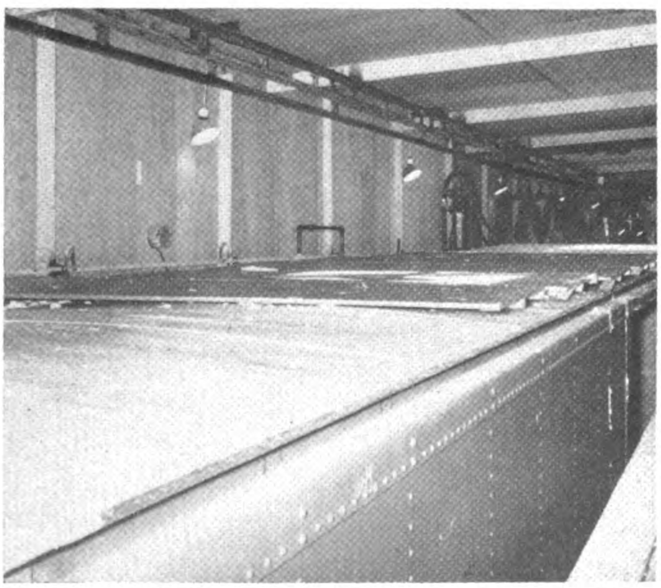
Partial List of Suppliers

Truck frames, bolsters, pedestal adapters	National Castings
Truck side bearings	Standard Car Truck
Cushion underframes	Keystone Railway Equipment Waugh Equipment
Air brake equipment	Westinghouse Air Brake
Brake shoes	American Brake Shoe
Brake levers, truck levers	Schaefer Equipment
Brake beams	Unit truck
Hand brake	Ajax-Consolidated
Roller bearings	Timken Roller Bearing
Roller bearing retainers	Buckeye Steel Castings
Couplers	Symington Div., Symington-Wayne
Couplers yokes	Omaha Steel Works
Strikers	Blaw-Knox
Draft gear	W. H. Miner, Inc.
Draft-gear retainers	Illinois Railway Equipment
Slack adjusters	American S.A.B.
Car ends and roof	Standard Railway Equipment
Car sides	Youngstown Steel Door
Doors	Superior Car Door
Running boards	Apex Railway Products
Flooring	Doweloc Div., D. B. Frampton
Insulation	E. I. duPont de Nemours Pelron
Load dividers; side fillers	Evans Products Union Asbestos & Rubber
Car liner panels	Landreth Industries
Undercoating	J. W. Mortell
Car cement	Milor
Paint	Pittsburgh Plate Glass

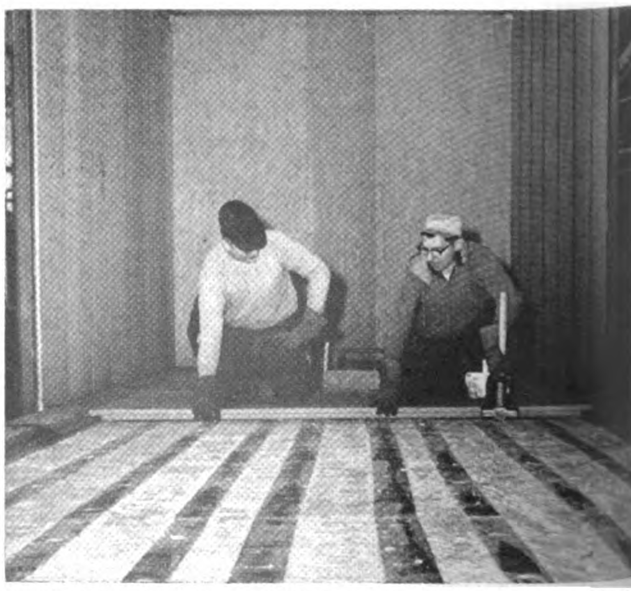
ing engineers, are able to simultaneously foam at two stations with materials metered and mixed under exact conditions at one point.

The insulation system contains two components—a resin heated to elevated temperatures and a prepolymer cooled to 68 deg F which contains the fluorocarbon blowing agent. Both are continually circulated through their respective piping systems and come together at the mixing head for delivery to the car. When any step of the foaming operation ceases, a solvent under pressure and controlled by a pushbutton on the mixing-head assembly cleans the head. Air under pressure removes the solvent. The two unmixed chemicals are recirculated immediately.

Push buttons on the mixing head control the amount of liquid for each pass around the sides and ends and automatically cut off when a predetermined amount is supplied. Capacity of the large mixing head for foaming the sides, ends and roof is 80 lb per min. Sides and ends are filled from overhead in three consecutive passes. The mixing head for the floors and doors has a capacity of 30 lb per min. Floors are foamed longitudinally. The roof is prepared for foaming by apply-



Plywood forms, which are wax coated, to prevent adhering of insulation, are removed from top of body before roof is applied.



Doweloc floor panels are installed over foam-insulated floor; panels are then nailed to longitudinal oak floor stringers.

**'ars have outside height of 15 ft; outside width of 10 ft 7⅜ in. Plug doors have clear opening of 10 ft. This is one of 50 cars equipped with Key-
tone Shock Control hydraulic cushioning. Body is painted dark green with wide yellow stripe and has Scotchlite emblems.**

ng varnished plywood forms coated vith wax to prevent the foam from dhering to the surface. It is foamed hrough pre-drilled holes in these roof orms, filling the spaces between each vood carlines across the car. The loors are foamed in flat position in a igid jig which keeps them perfectly quare. Foamed-in-place insulation in loor is 2 in. thick; sides 3 in., and ceil-ng from 4½ to 5 in.

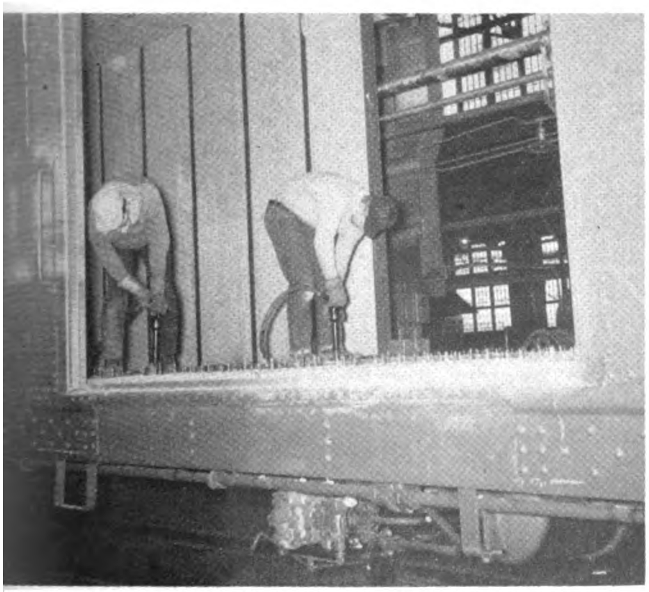
The first 50 cars built were equipped vith Keystone 20-in. travel shock con-rol hydraulic cushion underframes. 'orty have Equipco steel load divid-rs, with 15 having permanent and 25 emovable Equipco side fillers. The re-naining 10 cars were equipped with Evans steel loaders and Evans permanent side fillers. The second fifty cars are equipped with Waugh 12-in. travel Super-Cushioned ring spring underframes, Evans aluminum load dividers and Evans permanent side fillers. Landreth liner panels are applied to the last 25 cars off the line.

The car sides are steel girder design, assembled complete, including the side plate, side sheets, side sill angles, corner posts, intermediate side posts, door posts and door fixtures. The side plates are ¼-in. copper-bearing steel ZU sections. Side-post Zees are riveted to the side plate, side sill and 0.10-in. copper-bearing steel side sheets. The corner posts are $^{3}/_{16}$-in. copper-bearing pressed W sections. Box section door posts are two ¼-in. Z-section pressings. The bottom section of the corrugated end is ¼-in. thick; top section, $^{3}/_{16}$-in. thick. The diagonal panel riveted roof consists of No. 14 gauge copper-bearing galvanized sheets.

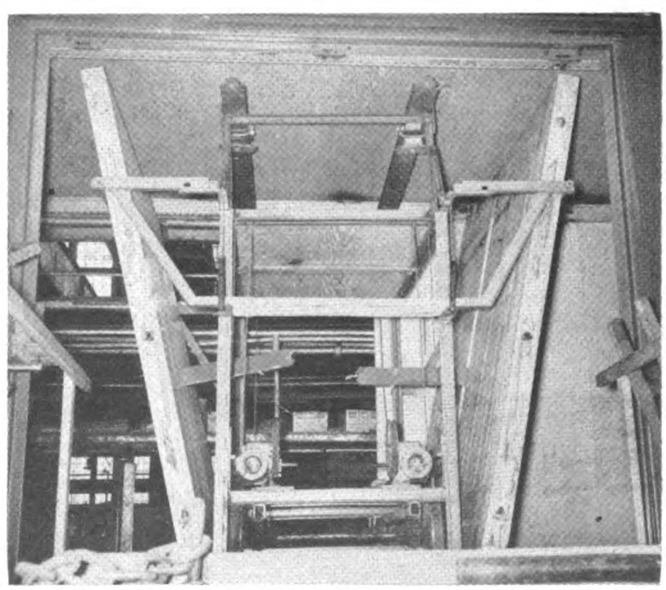
Plywood ceiling lining is ½ in. thick; side lining, ¾ in.

The C-1 shock control trucks are equipped with 33-in. cast-steel wheels 6 x 11 AAR standard freight-car roller-bearing axles, and $3^{11}/_{16}$-in. travel springs. Each spring group is composed of seven outer coils and six inner coils.

Capacity of the car is 4,585 cu ft. Inside length is 50 ft 1⅛ in.; inside width, 9 ft 6¼ in.; inside height, 9 ft $10^{15}/_{16}$ in.; and light weight, 86,300 lb.



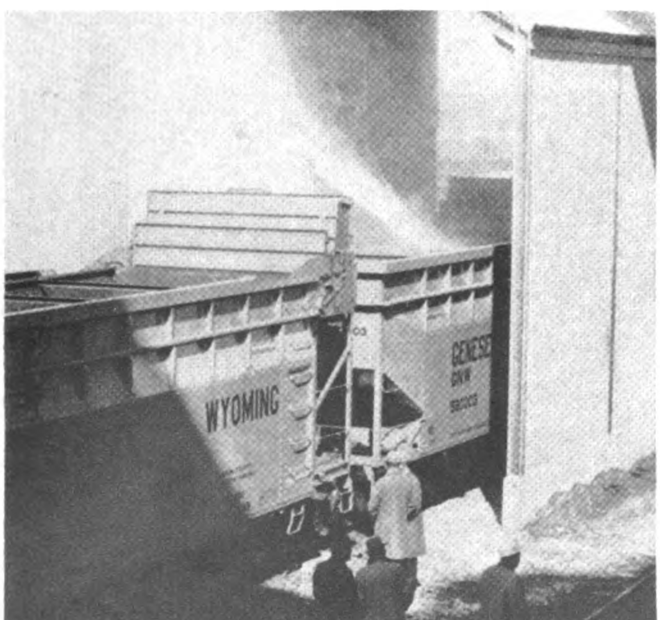
astening of floor to longitudinal stringers is done with automatic nailers. ides and ends are finished with various materials.



Device developed at Havelock shop is used to position the one-piece aluminum load dividers for easy installation in the car.

Self-storing MacGregor roof is operated by crank powering chain attached to panel which is at B (near) end of car when roof is in closed position.

G&W Hoppers Have Roll-Away Roofs



Lading can be placed so as to fill edges of car level with tops of sides, a procedure not economical in standard covered-hopper cars.

Storing ramp at A end of car tips individual roof sections and causes them to move out to occupy minimum space; roof cranks from both sides

Panel type roofs which can be rolled back to uncover the entire tops of hopper cars are increasing the efficiency and speed of bulk-salt loading on the Genesee & Wyoming. So encouraged has G&W management been by reaction of consignees and by its initial loading experience that already bids are being received on 200 additional higher-capacity cars.

The 50 G&W hoppers, just delivered by Greenville Steel Car, represent the second U.S. application of the integral, sectionalized MacGregor roof. First was on a 46-ft 21-yr-old Bessemer & Lake Erie gondola which has now seen almost two years of service moving unpackaged steel coils and sheets (RL&C, July 1961, p 51). Roofs of this same design have been applied to 4,000 European cars.

"The potential in this type of roof is only beginning to be realized," says A. R. Frampton, president of Railroad Supply & Equipment Inc.—U.S. licensee of MacGregor-Comarin Inc. The MacGregor roof was first developed as a cover for ship hatches. Mr. Frampton points out that these integral roofs have been widely used in Europe as replacements for tarpaulin covers on open-top freight cars. In the U.S. both the gondola and hopper-car roof applications have been sanctioned by the AAR Mechanical Division and the ICC. A box-car installation has already been proposed by Railroad Supply & Equipment, and an experimental van type trailer was so equipped two years ago.

The first major U.S. application—on the G&W hoppers—was made, according to the road's management, for the following reasons:

- Approximately 20% increased load per car through the filling of what would be voids on standard covered hopper cars;
- Ease of loading and unloading;
- Simplified inspection of lading and of car's interior.

"We feel that tremendous advantages are offered in that 95% of the available cubage will be utilized at point of origin," says J. N. Kiefer, Jr., general manager of the G&W. "Fewer [cars] are required to handle a given amount of tonnage, meaning less handling both of loaded and empty cars on the G&W and its connections."

Each MacGregor roof section rests on a pair of flanged rollers which run on tracks mounted on the car's top side angles. Tracks, rollers, and the edges of the sections—along with the chains attached to each side of the panel most distant from the driving crank—are housed in a box-shaped structure atop the side angles. This arrangement is designed to form a weatherproof enclosure for the sides of the sections when the roof is in closed position. Ends of the sections lap over each other so that the transverse joints are also watertight.

To open the sectional roof, a lock adjacent to the hand crank is released. Movement of the crank moves the chains extending down both sides of the car so that the leading roof section at the far end of the car is pulled toward the operating crank. The leading section pushes each intermediate section toward, and into, the storage ramp as it is pulled down the length of the car. The chain and drive, manufactured to close tolerances, form a positive drive without slippage, producing completely smooth operation. All rollers have Oilite bushings so they will never require lubrication.

In addition to its main rollers, each roof section has a set of guiding rollers. The guiding rollers tip each section into its vertical storage position as it reaches the end of the car. The storing ramp slopes downward so the sections automatically move to occupy a minimum of space.

Standard Components

All intermediate sections, pocket wheels, rollers, and other parts are of one size, regardless of car length, so as to provide the greatest possible interchangeability.

During closing of the roof, the guiding rollers return each section to the horizontal position. The endless chain again moves the leading section. This section is linked by a pair of short chains to the section immediately behind it. Each succeeding section is similarly connected to the one behind. As the leading section is moved down the car, its pull lowers each section to interlock with the one ahead and then rolls it to its final fully closed position.

The crank is operated by one man. The cranking pressure required is about 11 lb. At a normal cranking rate, the roof can be closed or opened in less than 2 min. Because the roof sections are joined with each other only by the short chains, it is possible to replace any damaged section by simply lifting it from the storing ramp and substituting a good section.

Although the overlapping of the sections and the gutters which form the chain runway keep rain from entering the car, there is some ventilation through the overlaps. This is a feature attractive to the Genesee & Wyoming which has condensation problems with conventional covered hoppers loaded with salt. Following completion of the MacGregor roof installation on the B&LE gondola in 1961, the waterproof aspect was tested by hosing the car with water at 120 psi pressure. There was no seepage. Seven years' operation in Europe has shown that moisture does not enter even when cars run at high speeds.

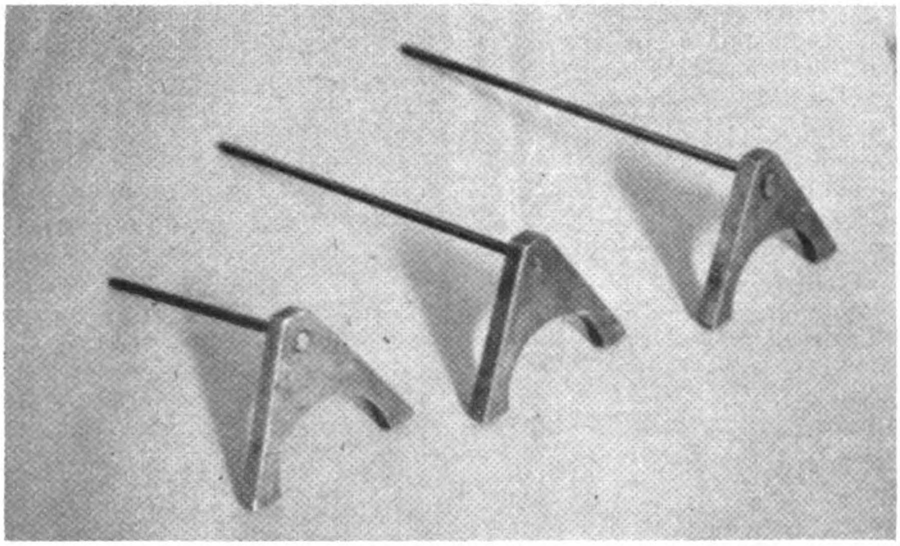
The G&W hoppers, now of 70-ton capacity, were rebuilt by Greenville from AAR standard 50-ton, twin-hopper, inside-stake cars built about 15 years ago. New 5½ x 10 axles, new solid bearings, and higher-capacity spring groups were used to step up the load-carrying ability of the trucks.

The body was completely reconstructed with a 17-in. extension on the top and with one end cut back for the storage space for the roof panels when the roof is in its open position. The original hopper chutes and doors have been retained, and the original inside length of 33 ft has been reduced to just under 28 ft 6 in. Capacity of the rebuilt body is 2,300 cu ft. Lightweight of the car is 48,300 lb.

The car end adjacent to the roof, storage space is vertical, located on the bolster center line. This end has pressed reinforcements like those used on box-car ends to compensate for the removal of the conventional sloping floor. Side and end ladders at this end of the car have been moved from the corner post, now extending up the side and vertical end of the body.

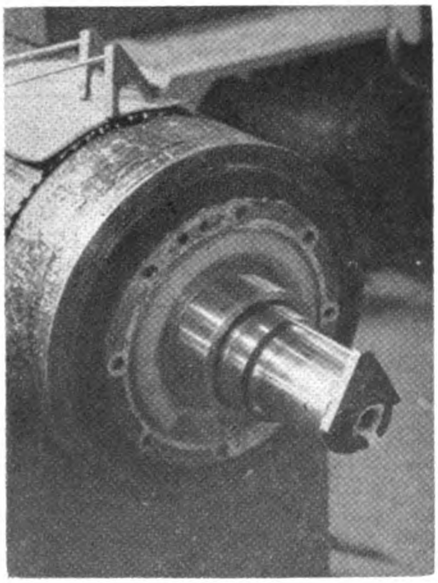
Roof panels, formed of 16-gauge steel, have pressed corrugations to strengthen them. All intermediate panels are 64 in. long; end panels, somewhat shorter. Hand cranks for operating the roof are mounted at side-sill height on each side of the car with vertical drive chains extending up to the shaft and pocket wheels at the end of the roof. From this shaft extend the two chains that run the length of the car to move the end panel back and forth during opening and closing.

The 200 additional hoppers for which G&W is now receiving bids will be of the hopper type with MacGregor roofs, 45-deg slope sheets, and Enterprise discharge gates. The cars will have 100-ton trucks and a length of 40 ft 6 in. over strikers.



Three different gages used in Seaboard shop measure from shaft end to quill, to the collar and, finally, to the outer edge of the inner race of the roller bearing.

How Seaboard Reduced Motor-Bearing Failures



Gages for measuring from end of the armature shaft have been important factor in proper assembly of Seaboard motor bearings. Study showed merits of proper bearing location.

Greater precision in application of pinion-end components to traction motor armatures has cut the incidence of armature roller-bearing failures for the Seaboard. Special gages have made the precise assembly procedures possible. The electrical department of the road's Jacksonville, Fla., locomotive shop now uses these gages when assembling traction motors, all of which are completely rewound and rebuilt there. The Seaboard's electrical shop is tooled to perform all the overhaul operations.

In January 1958 a study was undertaken of armature bearing failures. An analysis was made of bearings which had failed and bearings which had been in service for various mileages. Usually, destruction of the failed bearing and its related parts made it impossible to determine the cause of failure. By analyzing bearings which had been in service for different periods of time and mileage, however, it was finally possible to decide the most probable causes leading to the failures the Seaboard was experiencing.

Many bearings removed from the pinion end of the motor were found to have minute particles of steel imbedded in them. The grease was also found to contain the same particles, dispersed throughout. It was found that the particles were produced by a shearing action within the labyrinth seal grooves. After further examination, it was found that in each instance the path of the rollers on the pinion-end inner race was not centered. It was concluded that, whenever the inner race is not centered under the rollers which are fixed by their mounting in the pinion end housing, parts on either side of the inner race would rub. This interference produced the minute steel particles which were found with close examination of the grease and bearing.

After the study of bearings before and after failure, the investigation turned to the motor building procedures used in the shop. While it was determined that the procedures used were consistent with dimensions given for pinion end build-up, in several cases it was found that pinion-end rollers were not centered on the inner races and related parts on both sides of the bearings did not have sufficient clearance. None of the normal measurements taken from specified procedures would detect this condition; end play is controlled by the commutator-end bearing and would not indicate such a condition on the pinion end.

The test-running the motor at top speed, without load, would not show the condition because at no load there is no thrust to produce the shearing action within the labyrinth seal. Apparently this action occurred only when a heavy thrust was imparted to the armature under load, even when insufficient clearances existed at the labyrinth seal.

Rebuilding Method

In the build-up, caution must be exercised to insure that each rotating part is in the proper position with respect to the mating part which is stationary in the housing. To insure the proper measurement, gages have been made to calibrate each part as it is applied to the armature shaft. The gages measure the correct distance from the end of the armature shaft with tolerances of plus or minus $\frac{1}{64}$ in. allowed. Three gages are used in assembling EMD motors. It has been found that the most critical dimension, checked with the first gage, is that from the shaft end to the end of the quill, a distance of $11\frac{5}{8}$ in. The Seaboard shims or machines the quill to get within the allowable tolerance on mounting of this component. The second gage, $10\frac{1}{4}$ in., is used to measure the distance from the end of the shaft to the collar. The third gage, $6\frac{19}{32}$ in., is used to measure the distance to the outer edge of the roller-bearing inner race.

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U25B completes 8,000,000 unit miles on 6 major American railroads

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During spot maintenance on another, three men are assigned to other jobs when the U25B's are scheduled. Design that reduces maintenance is the reason. The U25B has only four rotating electric machines above the platform, a primary air cleaner which requires no servicing, a simplified piping system and equipment pressurized to keep out dirt.

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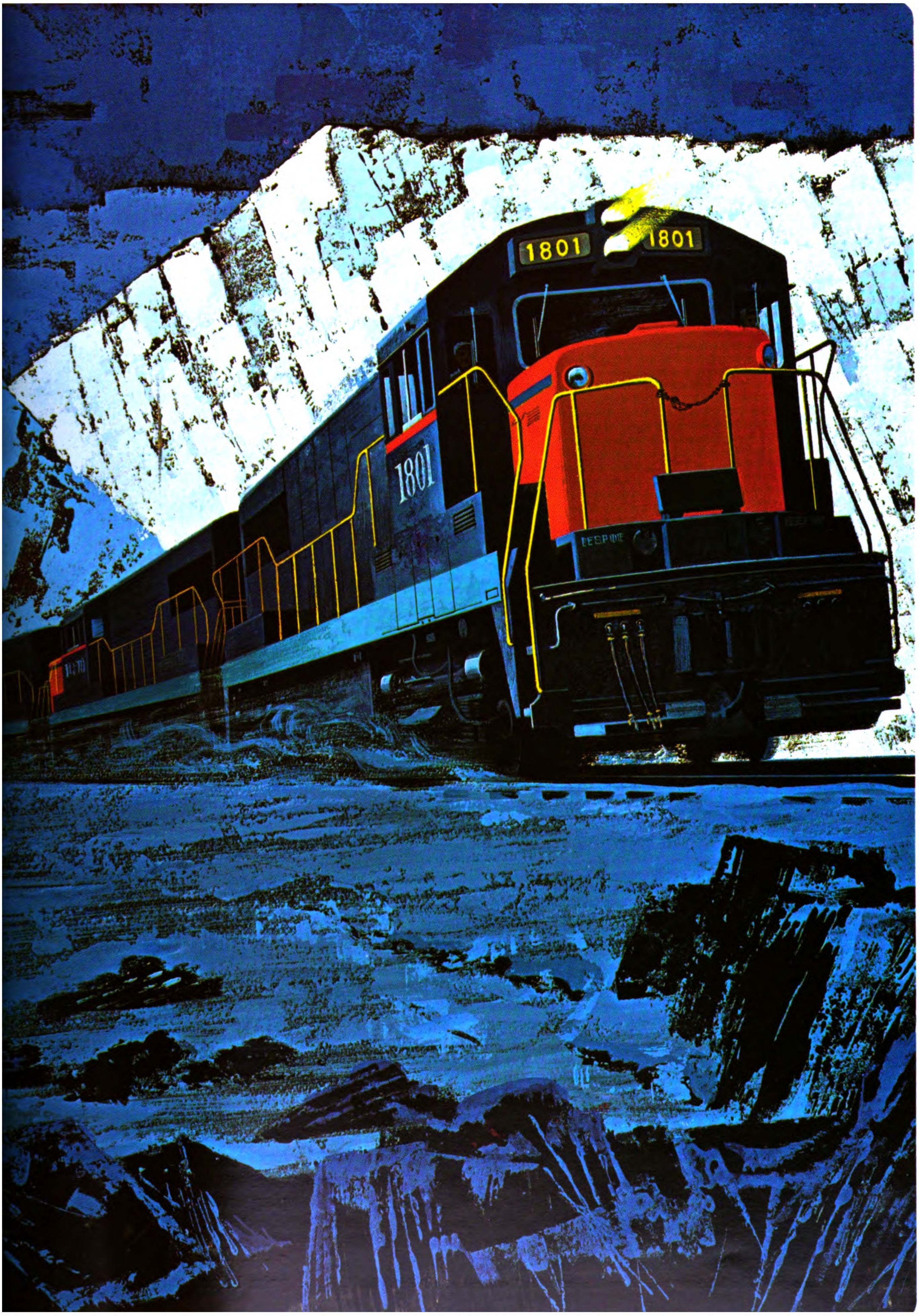
117-19

GENERAL ELECTRIC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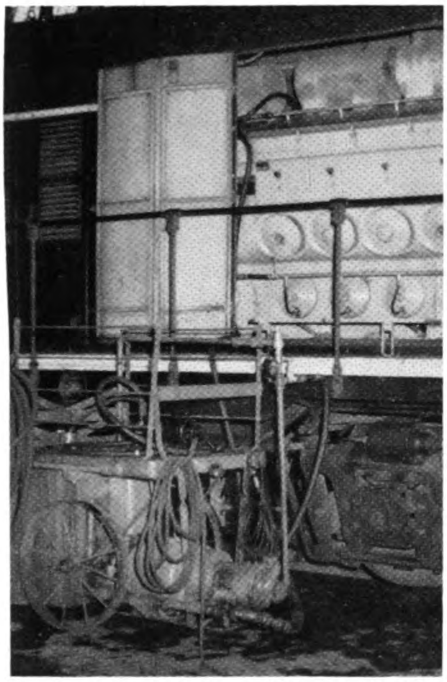
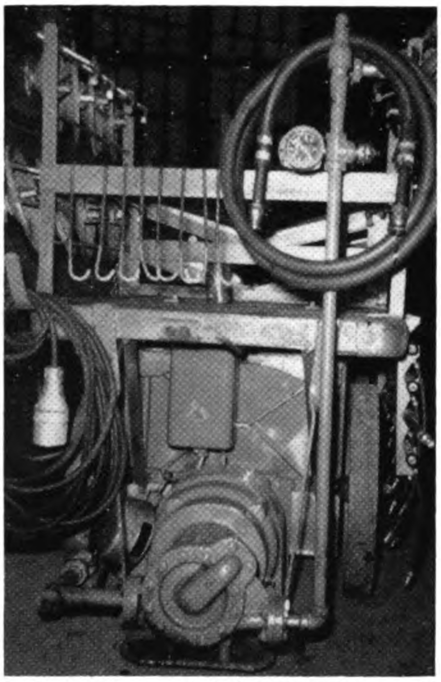
Diesel Repair Time Savers

Cleaning Truck for Diesel Engines



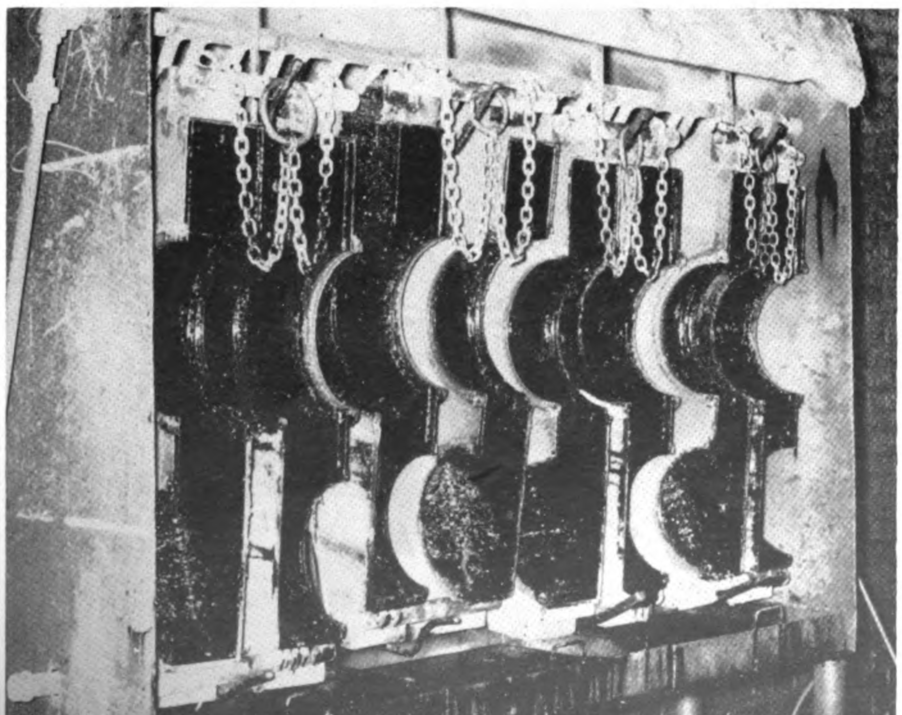
Cleaning truck can be moved directly to the side of any locomotive which is scheduled to have the diesel engine cleaned. Solvent lines run to top deck and to crankcase.



Racks built on truck hold the crankcase and air-box inspection covers during cleaning. Hoses and lines can be stored conveniently when unit is not in use.

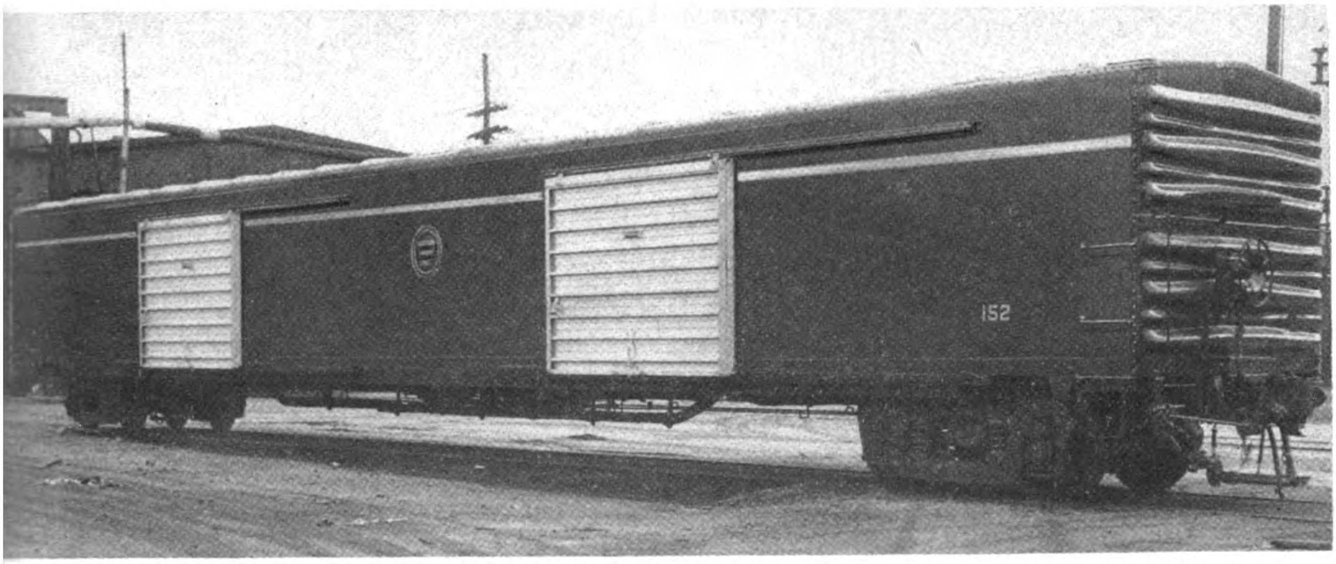
A baggage truck equipped with pipes, hose fittings and attachments simplifies diesel-engine cleaning at the Clinton, Ill., shop of the Illinois Central. The truck is moved to the side of a locomotive when needed, but is stored away from work sites when not in use. A chemical vat and pump are mounted beneath the truck floor. The pump forces a caustic compound through the engine during cleaning. When finished, solution is returned to the vat. The engine interior is then flushed with fuel oil. A valve is used to transfer from the cleaning compound to the fuel oil which is pumped from a barrel. Racks at top of truck hold four hood doors and 16 crankcase covers. The IC estimates a saving of 2 hr on each inspection. The unit eliminates a central stationary location for the pump and attachments along with piping and hoses which would be needed for six washing locations along tracks in the shop where locomotive repairs and inspections are performed.

Removing Lubricant from Gear Cases



Steam heat softens gear-case lubricant so it flows into water bath at base of cabinet.

To avoid extensive cleaning in solvent vats a steam cabinet is used to remove asphaltic type lubricant from gear-case covers at the locomotive shop of the Northern Pacific in Livingston, Mont. The steel cabinet is equipped with two 1½-in. header pipes, top and bottom. Steam from the shop line at 90 psi is piped to the top header. Vertical ¾-in. pipes, bent to the contour of the covers, connect these headers. There are three pipes behind each cover and one on each side. Paired covers, with the sloping ends at the bottom for easy draining, are supported from the top of the cabinet. In the base of the cabinet are three removable pans filled with water. As the lubricant drips from the covers, it floats on top of the water. Some 150 lb of lubricant is removed when stripping ten trucks per week. Four sets of covers can be adequately drained in one hour. The covers are then ready for inspection and any necessary repairs before being reapplied.



rs, painted in new blue color scheme recently adopted for all MP passenger-train cars, are equipped for operation in any of road's trains.

ΛP Builds High-Capacity ʒox-Express Cars

The fifty 70-ft box-express cars just ιt into service by the Missouri Pacific e said to be the longest cars of the K classification ever built. The units, pable of producing higher per-car venues handling express and storage ail in MP passenger trains, were de-gned to minimize construction costs.

The cars, built in the road's De Soto, o., shop, have cross-sections similar those of the latest streamlined pas-nger equipment. They replace fifty ⅟½-ft, 50-ton, double-door box cars nverted to BX cars in 1950. The w cars, with a light weight of 67,000 , are 1,000 lb heavier than the con-rted cars. Each new car has 34% ore floor area than an old unit, while e increase in weight is only about %.

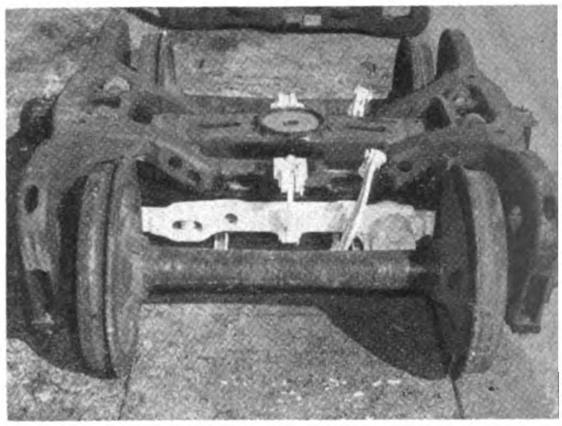
When the 50-ton box cars were nverted, 25 were equipped with BX ucks and 25 retained their original -3 trucks. All had conventional solid arings. While generally satisfactory, ey were deficient in interior length d lighting. Couplers, draft gears, and am-heat lines were not well adapted operation in long passenger trains. ese conditions, plus a critical need r the double-door box cars for gen-al freight service, led to the road's cision to build new pessenger-serv- cars to more effectively meet cur-nt requirements.

Design of the new cars closely follows freight-car construction. It was dictated by the need to keep costs at a minimum and to permit their building in the road's freight-car shop. The all-welded underframe is OH steel. The center sill consists of two AAR Z-26, 36.2-lb USS Tri-Ten sections welded full length. Tri-Ten was used because the calculated stresses were such that a 50,000-lb yield point was required.

Each car's four 9-ft doors, supplied by Superior Car Door, and the panel-type roof, supplied by Standard Railway Equipment, are aluminum alloy to reduce weight. Aluminum two-piece Huck bolts and collars were used for assembly of roof panels and for fastening to the side plates and Standard steel ends. The car sides, built by International Steel, were shipped in two pieces for welding on the center-link of the car when assembled on the underframe. Cars have Symington couplers and Waugh draft gears.

Doweloc 1¾-in. hickory flooring is used in the doorways; 1¾-in. tongue-and-groove fir through the remainder of the car. Car sides and ends are lined with ½-in. exterior-grade plywood. Side lining is stapled to 2¾- x 3-in. nailers at side posts.

Twenty-five of the cars, equipped with reconditioned BX trucks removed

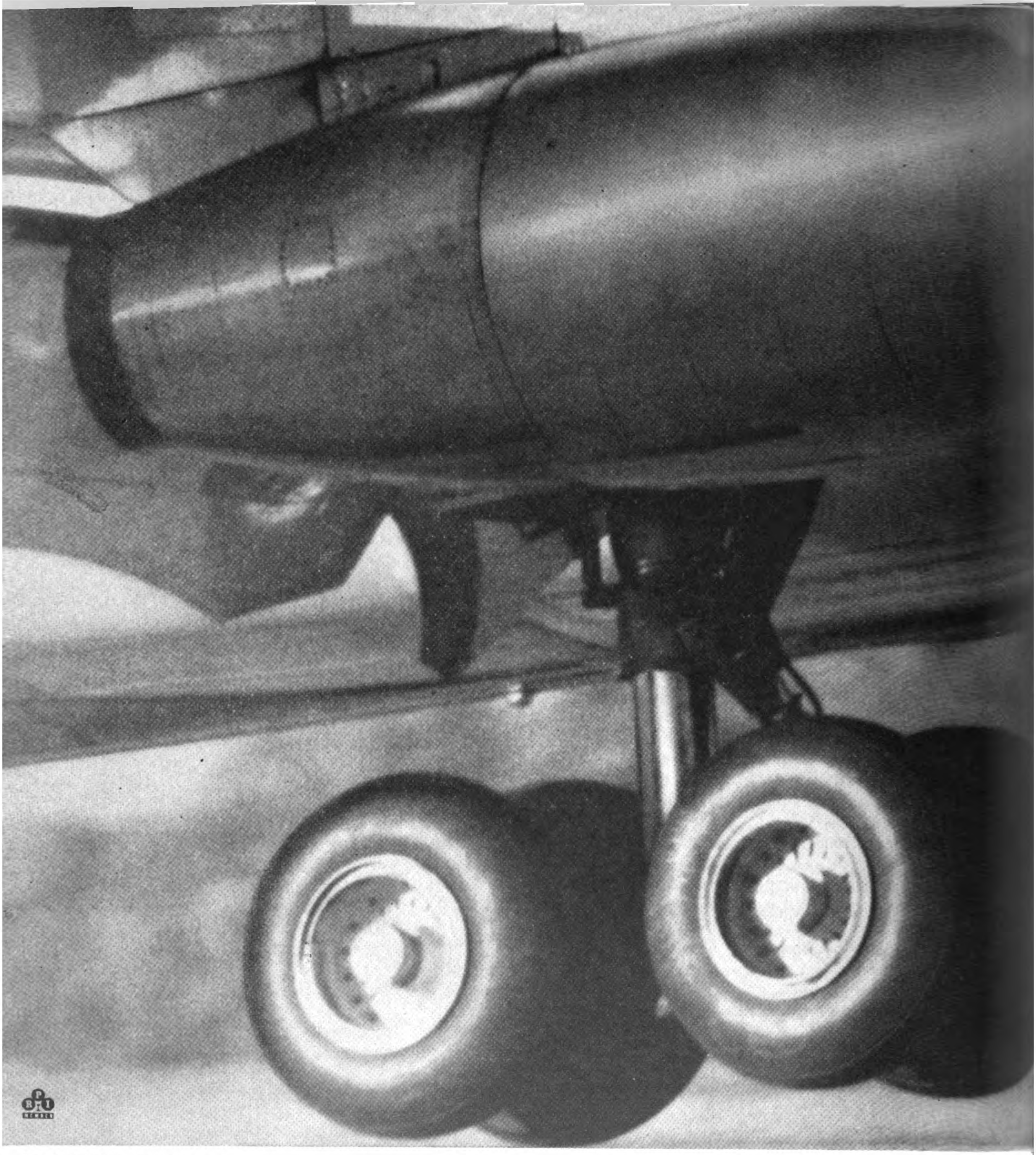


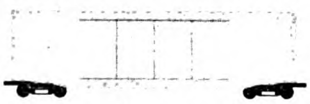
Trucks equipped with Wabcopac units are being compared with trucks having standard braking.

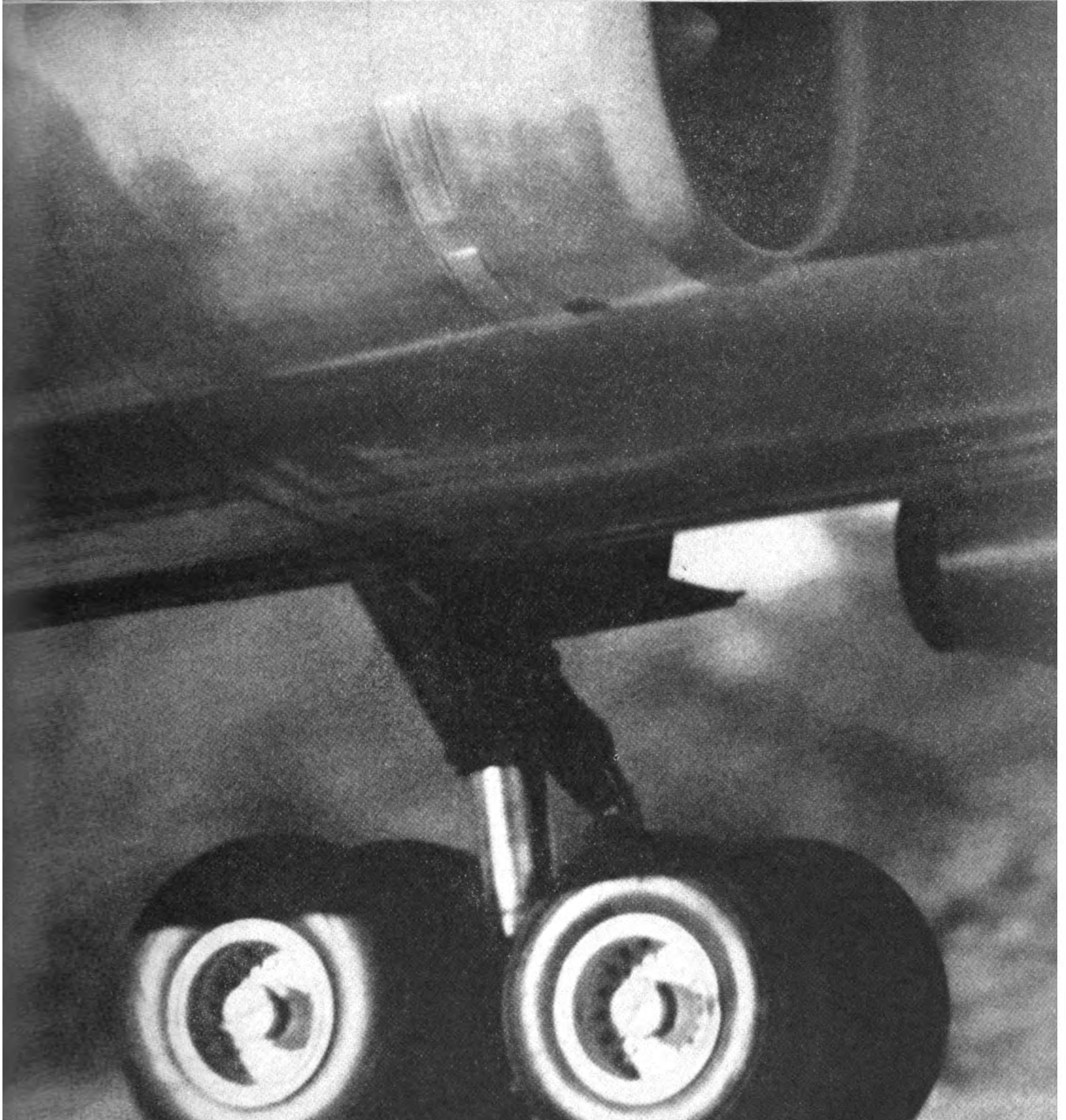
from the older cars, have conventional brake rigging and cast-iron shoes. The other 25 cars have new General Steel inside-swing-hanger BX trucks equipped with Wabcopac brake assemblies and Cobra shoes.

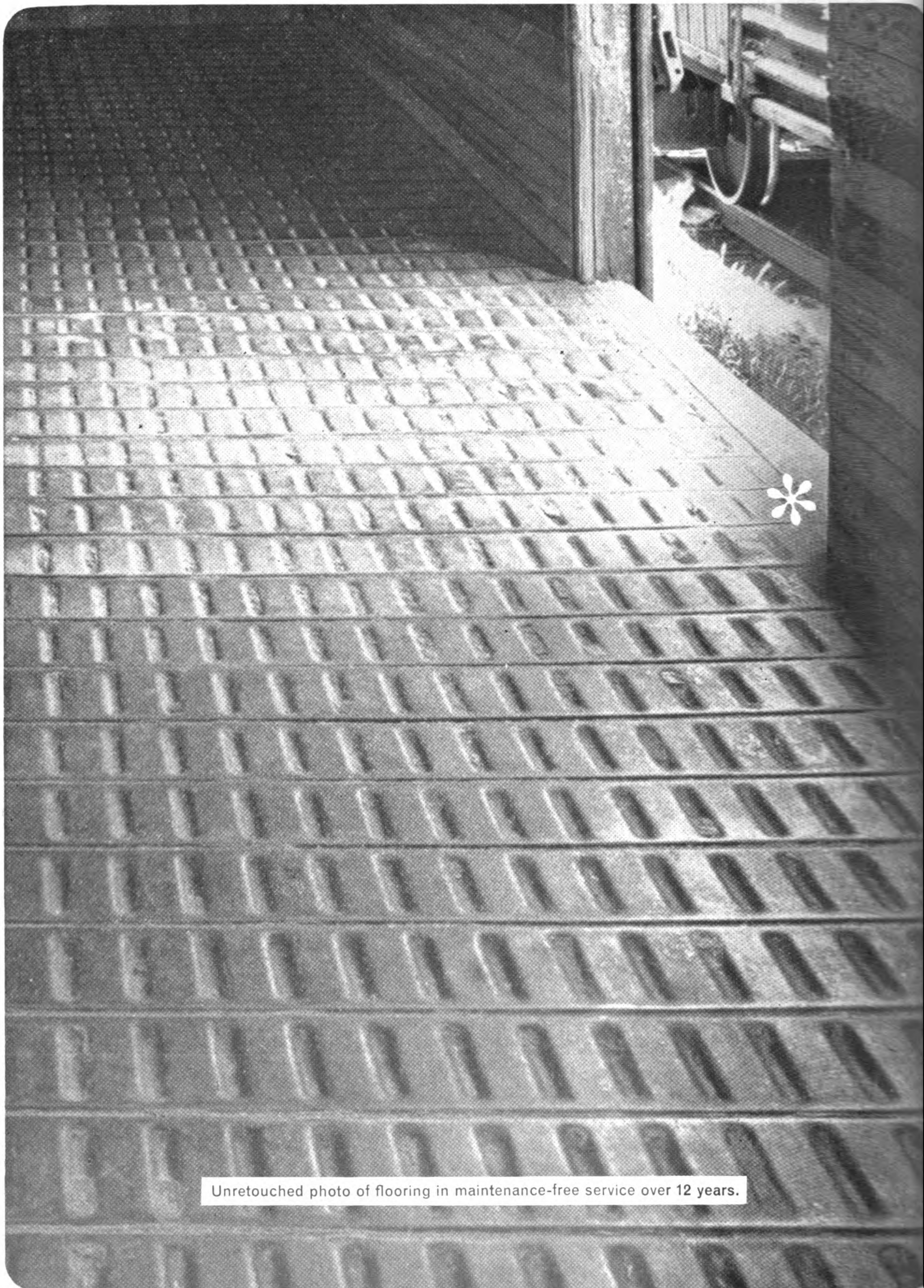
Break-away tests were made on typical cars of each group to insure that braking characteristics were identical. It was necessary to reduce the braking ratio on the cast-iron-shoe-equipped cars to obtain identical stopping distances at full and partial service-brake applications. Data is now being obtained on brake maintenance and shoe replacement costs.

All 50 cars have 33-in. rolled-steel multiple-wear wheel and 5½ x 10-in. Timken AP roller bearings. The cars are not equipped with batteries or generators. There are two Pyle-National 110-volt receptacles at diagonal door openings, and four overhead lights are equally spaced on the center line of the car. All cars have 2½-in. steam lines with Vapor end fittings.









Unretouched photo of flooring in maintenance-free service over 12 years.

20 Roll Them Out Like New

Rebuilding Frames and Components

In Part 7 of this series (Feb. 1958, p 48) the importance of locating and recording defects in magnet frames was indicated. This is the only sure way of knowing what repairs are needed. A check list for a traction-motor magnet frame was suggested. On it, the inspector can record actual measurements of the wear surfaces. Then the machinist will not have to recheck each fit at the time of repair.

When a machine is disassembled for periodic overhaul, it is logical to assume that most dimensions will be different (either larger or smaller) than when the machine was new. A certain amount of wear is permissible. Sooner or later, however, it exceeds the limits recommended by the manufacturer— often called the wear or condemning limits. There are a variety of repair methods that may be used to restore worn surfaces to original manufacturer's dimensions.

The first thing to consider is how to replace metal that has been worn away. Electric welding is probably the most common method of making this kind of repair. Many good electrodes are available. The welding method is easy and gives a good machinable surface. While there are other ways to restore metal—plating, metal spray, peening or rolling—only arc welding will be discussed.

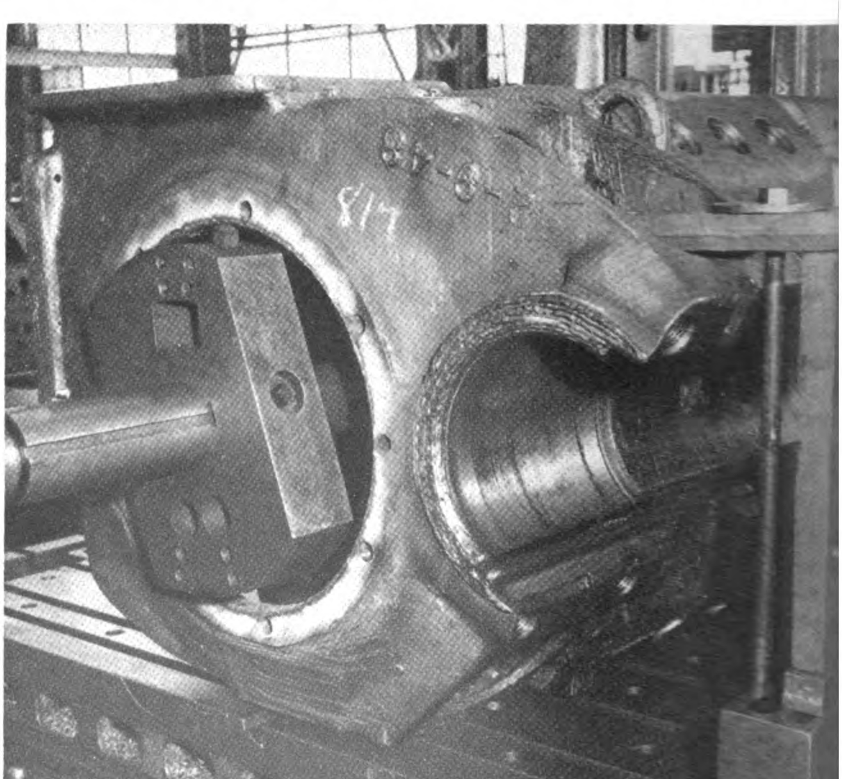
Even though the surface will be machined after welding, it is wise to hold localized heating to a minimum. Therefore, a sequence of weld metal applications should be made. For example, when working on the frame-head bore face of a traction-motor frame, start at the top of the bore and weld up an arc about 6 to 8 in. long. Then do the same on the bottom of the face. Peen the two areas that have been welded. Continue welding in a clockwise direction, each time making an arc about 6 to 8 in. in length. This will hold frame warpage to a minimum. If the welding is followed by a good peening, stresses retained in the metal will be further reduced.

Certain equipment is necessary to handle magnet frame repairs. If proper machines are not available, suitable units should be returned to original manufacturers for factory rebuilding rather than attempting to do the job with makeshift equipment. Probably most necessary is a good 5-in. horizontal boring and milling machine. This should be located in a crane-equipped bay with sufficient overhead clearance to move the frame in and out of the boring mill. A good electric arc welder with an assortment of electrodes should also be available.

Examination of the inspector's check sheet for the machine will indicate what repairs are needed. Basically, repairs are classed either as major or minor. In the case of minor repairs, it will probably not be necessary to remove all the field coils, cables and brush holders. Where major repairs are necessary, the frame will h[illegible] be stripped. This is where pl[illegible] will help to keep the shop wor[illegible] steady and production at a good[illegible] Frames requiring only minor [illegible] should be worked first so the[illegible] be no lack of finished frames f[illegible] assemblers. Frames requiring [illegible] repairs can be worked on as[illegible] permits, although it is a good i[illegible] keep a few major repairs mov[illegible] all times. Just how this works [illegible] a given case will depend upo[illegible] work load and manpower availa[illegible]

Why Repair?

Since traction motors make [illegible] bulk of machine repair work, the[illegible] be discussed in more detail. Us[illegible] motors returned to the back-shop [illegible] been removed from service for a[illegible] age overhaul, having operated a[illegible] determined distance. This mile[illegible] usually dictated by experience wi[illegible] condition of the insulation sy[illegible]



Motor frame can be set up on horizontal mill; machine must be properly equipped for job.

This twentieth article in the series covering heavy maintenance of locomotive electrical equipment is by F. F. Ellrich, Locomotive and Car Equipment Department, General Electric Co., Erie, Pa. Part 19 appeared in the June 1962 issue.

ture bearings and greases also definite life expectancies based ıe and service mileage.

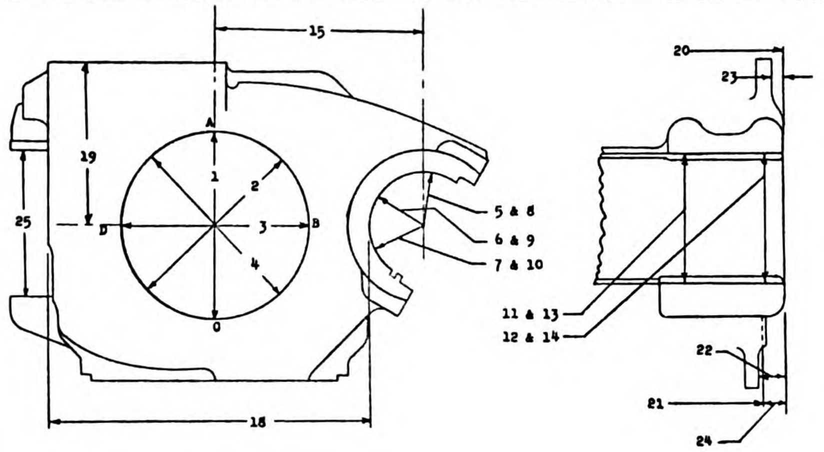
: us now consider parts of the ɛt frame that may be worn and fect this wear can have on motor tion. The distance between the ırt lugs on the motor frame is ined to a prescribed dimension ıt when the motor is mounted in uck and the nose support is in there will be a minimum clear- between the bottom lug and the m of the support pack. This ınce increases with wear, ulti- y giving the motor free motion g chattering wheel slip. The sup- pack cannot restrain the motor g its free travel, so inertia can : the motor to slam against the vith terrific force. In cases of ab- al wear, this blow can be hard gh to break the suspension lug ıe magnet frame.

is easy to see why the dimension een suspension lugs should be within manufacturer's recommen- ns. The use of hardened wear s has greatly reduced the rate of on these lugs, but, in time, even plates must be replaced. After worn plate has been removed, a plate should be held in position the dimension checked. If it is still nd recommendation, the nose sur- must be built up with weld and hined. This rarely happens on es with top and bottom wear :s. On frames with a wear plate ıe top nose only, the bottom nose usually show more wear. Make that the new wear plate is held ly against the suspension lug be- welding.

he distance between the center of magnet frame and the center of axle support assembly is very im- ant because it determines the dis- e between gear centers. If the pin- mounted on the armature shaft, the bull or ring gear, mounted on axle, are to mesh properly, the ınce between their centers must be ntained. If this distance changes much, either the teeth will inter- with each other, resulting in early ature bearing failure and rapid r of the gear teeth, or there will oo much backlash.

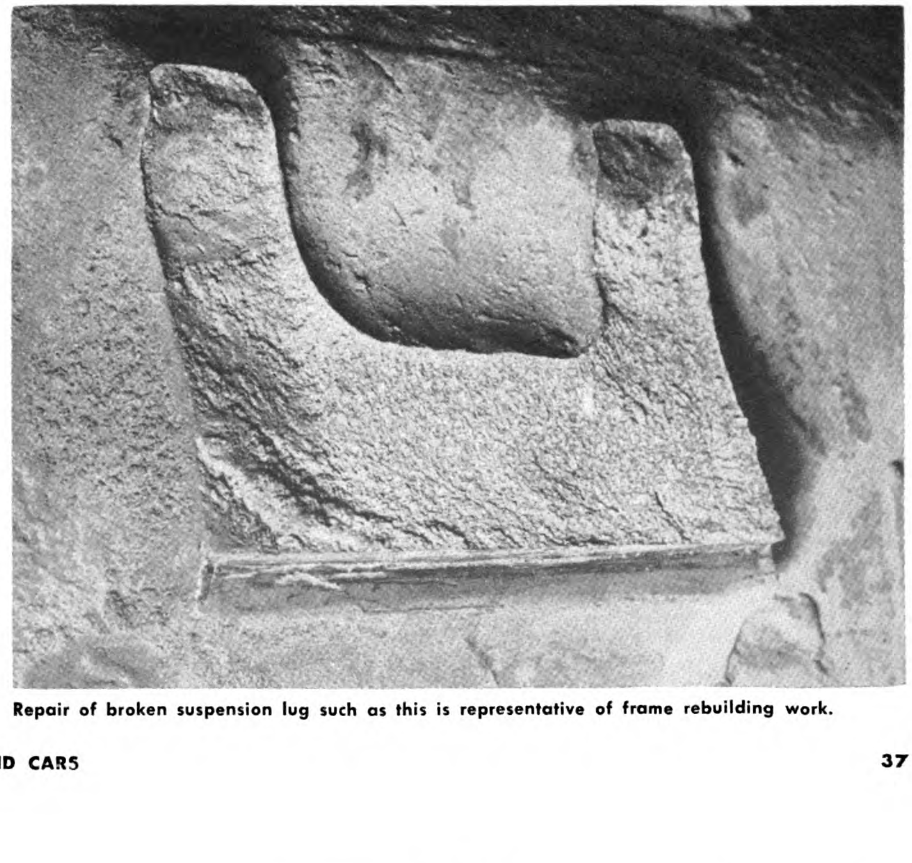
'o reduce wear between the frame d and the magnet frame bore, these ts are assembled with an interfer- e fit. Thus, there will be no free

(Continued on page 39)



TYPE	SN	LOT NO.	P.O.	
FRAME HEAD BORE PINION END	(1)	(2)	(3)	(4)
FRAME HEAD BORE COMMUTATOR END	(1)	(2)	(3)	(4)
AXLE BORE (OUTER) PINION END	(5)	(6)	(7)	
AXLE BORE (OUTER) COMMUTATOR END	(5)	(6)	(7)	
AXLE BORE (INNER) PINION END	(8)	(9)	(10)	
AXLE BORE (INNER) COMMUTATOR END	(8)	(9)	(10)	
RABBET FIT IN FRAME	PE (11)	PE (12)	CE (11)	CE (12)
RABBET FIT IN CAP	PE (13)	PE (14)	CE (13)	CE (14)
GEAR CENTERS	PE (15)		CE (15)	
ALIGNMENT OR RUN OUT PE	A	B	C	D
ALIGNMENT OR RUN OUT CE	A	B	C	D
SIDE AIR DUCT			CE (18)	
TOP AIR DUCT			CE (19)	
AXLE BORE FACE TO FACE	(20)			
FRAME HEAD BORE FACE TO FACE	(21)			
AXLE BORE TO BOTTOM GEAR CASE MOUNTING LUG	(22)			
AXLE BORE TO TOP GEAR CASE MOUNTING LUG	(23)			
AXLE BORE TO HEAD BORE	(24)			
SUSPENSION LUG GAP	(25)			

Report forms showing critical dimensions of individual frames produce machine histories.



Repair of broken suspension lug such as this is representative of frame rebuilding work.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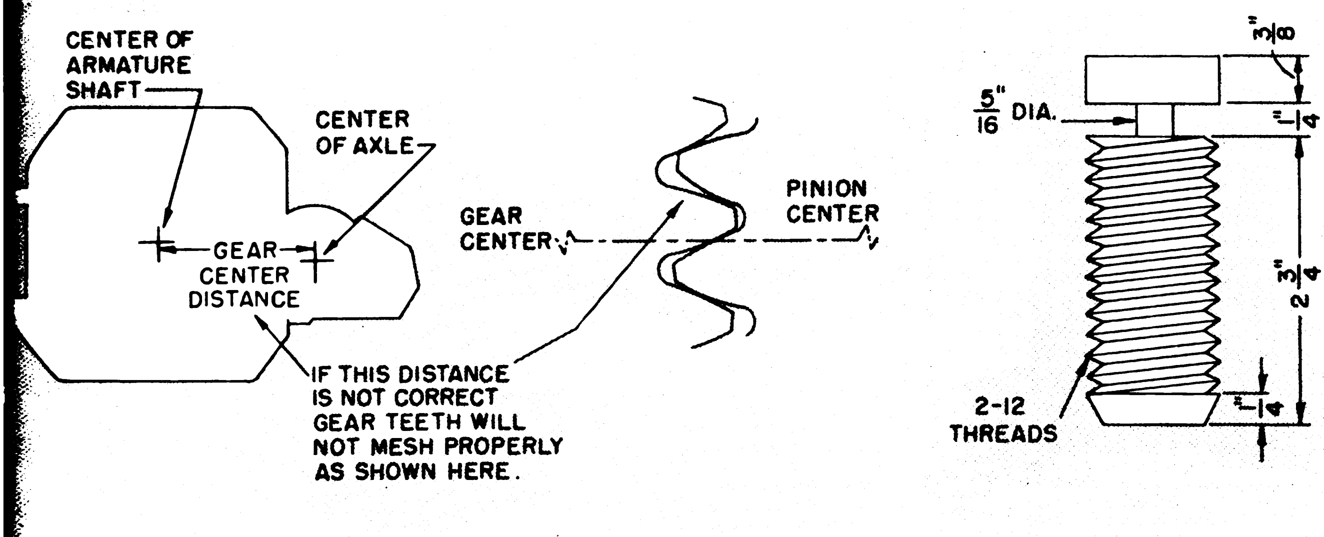

...er gear center distance is important in motor operation; rebuilding must be controlled so that distance is accurately established. Improper meshing ...produce undue bearing wear. Plug (right) can be used for filling bolt holes for axle caps so standard sizes of fasteners can be utilized.

...vement of the two mating parts ...en they are bolted together. It is ...portant that the fit dimensions be ...tored to the manufacturer's recom...ndations. Not only must the frame ...es be the correct distance apart, ... they must also be parallel. Other...e, the armature bearings will not ... properly aligned, causing preload... which will lead to an early bearing ...ure.

...leeve-type traction-motor suspen...n bearings must be held tightly in ... bore, or they will not operate satis...torily. If bore dimensions are worn, ...y should be restored to the manu...turer's recommendations so the ...rings will be clamped tightly when ... motor is assembled.

...tical Dimensions

...When the motor is mounted on the ..., there should be some lateral ...rance. Because of wear on the ...gnet frame and the axle lining ...ge, this clearance may become ...essive. The motor will then slam ...inst the wheel or bull gear with ...t force. These blows can damage ... motor. They also cause rapid ...ge wear, thus allowing still more ...ral motion. If necessary, the bear... bore faces should be restored to ...inal dimension so that the motor ... have the recommended lateral ...rances when mounted on the axle. ...n understanding of the critical dimensions of the magnet frame and how they affect the operation of the overhauled machine should make repairs easier. Remember that frequent reference to manufacturer's tolerances in this article is not an accident; these limits are the result of years of experience and should be followed closely. After the worn areas have been built up with weld, the frame is ready for machining. If the precautions are taken, a "like new" frame should result.

After machining is finished, some of the bolt holes will probably have to be restored. Frame-head face bolt holes, if not too badly damaged, can be repaired by the use of Helicoils or similar devices. The damaged threads are first drilled out with an oversize drill. They are then retapped with a special tap which is slightly oversize. The Helicoil insert is then screwed into the hole. This is a quick repair and it works quite satisfactorily even for this severe service.

There are several ways to repair the large tapped holes for the axle cap bolts. Helicoils can be used. Another way is to drill the hole to an oversize dimension, tap it and screw in a solid plug. After the plug has been installed, the top is broken off with a hammer blow. A light layer of weld is then applied to hold the plug in position. The weld surface can be ground smooth with a hand grinder. Using the axle cap as a template, the new hole can be located, drilled to a standard size, and tapped.

The solid weld method can also be used, but is more difficult. The threads must first be drilled out and then the entire surface of the hole built up. This is sometimes hard to do with small holes.

Ready To Go

Now the magnet frame is just about ready to go to the assembly area. Whether it has been entirely remachined, or been given only minor repairs, the check sheet should indicate exactly what was done. This may seem like a waste of time, but it isn't. When this frame comes in for repairs again, the check sheet can furnish its case history. A glance at the check list will show what work was performed the last time it was in the shop. With this information, it is possible to judge how good a job was done.

If all the critical dimensions of the frame have been restored to manufacturer's tolerances, it should be good for hundreds of thousands of miles of useful service. If it doesn't live up to expectations, something is wrong and should be investigated. Accurate and complete records are a big help in pinpointing the trouble. Record keeping may seem unnecessary and costly, but, in the long run, it will prove very worth while.

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted by LMOA members, those sent to the Editor by other readers are welcomed and published.

Electrical Cleaning

What are the most satisfactory methods for cleaning electrical equipment in place?

There are many pros and cons as to the effectiveness of using dry compressed air and solvent cleaners on electrical equipment. This method of cleaning, if used properly, will thoroughly clean motors, generators, cabinets and equipment, keeping electrical equipment failures to a minimum.

With normal operation of EMD road-switcher units, foreign matter in electrical equipment consists of dust from the atmosphere, carbon dust from brush wear, and copper dust from commutators. Dry compressed air will clean electrical cabinets well. If blown from both ends, compressed air will clean motors and generators satisfactorily.

However, these cleaning procedures will have to be altered somewhat on carbody type units and Alco units. Carbody units cannot be cleaned as easily as road-switcher units because the equipment is enclosed in the carbody. Blowing with compressed air will be more difficult, as there is no easy way for the dust to be exhausted to the outside. By using an exhaust fan mounted on the rear door of unit and closing all the other doors, the air flow will be sufficient to allow dust to be exhausted out of engineroom and not allowed to gather elsewhere.

Alco road-switcher units will need a greater amount of cleaning because the main generator is not sealed and is more susceptible to the entry of foreign matter. The electrical cabinets are of the open type, and dirt and debris can enter through the bottom of the cab floor. On Alco units with the open-type roller bearings and gears and open-type interlocks on the reversers, braking switches and power contactors, it is extremely difficult to keep dust from settling as there is always lubrication present to attract dirt.

When cleaning electrical equipment with compressed air or with solvent, it is very important that proper protective equipment be used and that all electrical circuits be dead. Equipment that has been washed with solvent should be allowed to dry sufficiently before testing with megger or hi-potential machine.

There are many factors:

- Proper lubrication is essential—an excess of grease and oil will only attract and hold dirt.
- Carbody hatches when should be cleaned thoroughly b being reapplied.
- Improved magnet valve and tro magnetic unit switches can be plied.
- All engineroom doors shou kept closed at all times when runn
- Carbody filters should be c
- Oil leaks, water leaks and m fold leaks should be eliminated.

If these cleaning procedures are lowed properly at the monthly tes the locomotive, the cleanliness of trical equipment will be kept at a m imum. Of course, methods will d if water, chromate, and oils are lowed to accumulate in equipment such cases, the only way to clean i use solvent type cleaner. Use the minimum needed, because these cle ers tend to break down insulation will contribute to an early failure equipment.

C. Bosco, diesel mechanical man, Southern Pacific.

Removing Core Plugs

What methods can be used to remove cylinder core plugs from EMD cylinder heads?

Removal of core plugs from cylinder liners and cylinder heads is done so infrequently that little, if any, attention is generally given to this operation. As a result, each attempt at removal becomes a costly operation because of the mutilation of the core plug, necessitating drilling and retapping. A simple two-step procedure accompli the removal of the plug successf and economically. First step is heat the core plug by use of an acety torch, concentrating the heat dire on the plug. Second, allow the he plug to cool to normal temperat The core plug can then be rea removed from the casting with no ther difficulty.

Ky Pruchnicki, supervisor loco tive maintenance, Southern Pacific

High Control Currents

What can be done about high currents tripping 15-amp control circuit breakers on Alco 1,800-hp road switcher when operating five units in multiple?

This problem originated when the lead unit of a five-unit consist broke a piston and the train had to be operated to the next terminal with the trailing four units pulling and the lead unit shut down. The 15-amp control circuit breaker tripped several times en route, causing a delay to an important piggyback train.

Tests were conducted on a five-unit consist with the lead unit shut down and battery switch open, but with control, fuel pump, and genera field circuit breakers closed and he light on "bright." The control and pump circuit breakers were closed the second unit. When field shunt contactors were energized in the tr ing four units, current readings ta on the control circuit of the second indicated 30 amp which tripped 15-amp control circuit breaker, ca ing loss of power in all units. The fi decision, rated as most effective economical, was to replace all 15-a control circuit breakers in this class locomotive with 30-amp circuit bre ers. This eliminated our problem.

J. A. Chisholm, supervisor die equipment, Canadian Pacific.

From the Diesel Maintainer's Note Book

ɛcite the Generator—Not the Maintainer

ɜordon Taylor

ɔ do its job, it is essential that the generator on a diesel locomotive ɛcited. To do an effective job of ɔle shooting, a diesel maintainer never become excited.

·ouble occurred on a GP-7, the trailing unit in a four-unit locomo- pulling a heavy freight train. The had instructions to set this unit at an intermediate point from h it would be dispatched by itself, ɜring a local train over a branch

ıst before it arrived at the point ·e it was to be set out, the unit sud- y lost its load and the crew was ɔle to make it pick up again. En- man Tom Hacker phoned the est division point, explaining that ad a stalled unit and needed help. What do you mean 'stalled'?" d the foreman.

That's about the best way to de- ɔe it," replied Hacker. "The unit been pulling its share of the load suddenly dropped it. The engine run, but it looks like the horses all run into their stalls. I can't hem out and back on the job."

Well, set the unit out," said the man. "I'll bring an electrician and e over to see what's wrong."

Vhen they arrived at the unit on the ıg, they found that the engine ıld run but that control trouble of e kind interfered with loading of main generator. The electrician, wing his diesel, quickly noted that load regulator was staying in mini- n field position and suspected that O-valve plunger was stuck. In ɛking, he found that the O-valve energized, a natural condition ·n the BF battery field contactor is n.

Energizing the BF contactor seemed ıe their problem. With it energized, C-D interlock would open and de- rgize the O-valve, allowing the load ılator to move away from minimum ɪ position.

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series of articles is based on actual ɜriences of men who operate and maintain el-electric locomotives.

The next question: What was interfering with the BF contactor so it would not pick up?

At this point, the electrician remembered that this model had a Road Service Switch—a toggle switch located at the controller. The switch has two positions: *Switching* (up) and *Road* (down). It controls the unit to cause either a fast or slow start, depending on the type of service being performed. In *Switching* position, the BF contactor is closed by current through the G-H interlock. In *Road* position the BF contactor is energized through the A-B interlock of the SH (shunt field) contactor.

In the *Road* position normal modified maximum field starting is provided, assuring a slow, smooth start. With the switch in *Switching* position, a faster start is provided by the use of a "teaser" circuit which allows the enginemen to more fully control the loading of the main generator by throttle position. In multiple-unit operation, the Road Service Switches in all units should be placed in the same position to insure that all units start uniformly.

The Road Service Switch was found to be in *Switching* position, wrong for the service the unit was performing in the m-u consist. When the Road Service Switch was thrown to *Road* position, the BF contactor closed and caused the main generator to pick up its load.

There still remained a question about what had interfered with the BF contactor when the Road Service Switch was in *Switching* position. That question would have to be answered, or there would be another trouble call when the unit was again placed in yard service.

A test was made. In *Switching* service the BF contactor is energized by closing of LRC contactor. LRC is normally energized by the C-D interlock on the LRS switch. LRS is a tumbler type switch located at load regulator. Checking LRS revealed that its C-D interlock was burned and dirty. This interlock was cleaned and worked by hand a time or two.

After this, the operation was normal. LRS caused LRC to pick up. When LRC closed, its interlock G-H closed, which caused the BF contactor to be energized. With BF picked up, its C-D interlock opened, de-energizing the ORS solenoid. When this occurred, the load regulator moved away from minimum field position and the main generator got excited enough to get the diesel horses out of their stalls and back on the job.

Most readers know that the overriding solenoid, ORS, is incorporated in the engine governor assembly. It is energized by a normally closed interlock, C-D, on the BF contactor. When ORS is energized, it causes the pilot valve of the load regulator to move upward ⅛ in., directing flow of pressurized engine oil against the vane motor to move the rheostat of the load regulator toward minimum field position. It follows that, to make the generator load up, it is necessary to cause the BF contactor to close so that it will open its C-D interlock to de-energize the ORS solenoid. This will cause the load regulator to move toward maximum field position to excite the generator to cause the engine to load up.

This case demonstrates how a clear understanding of the workings of the control system enabled an alert maintained to quickly solve the cause of the trouble.

A few days later there was another case of a GP-7 dropping its load. Again, the horses stopped pulling, but for a slightly different reason even though the BF contactor was involved. A passenger train was being hauled by this GP-7. When it was dispatched, there was no sign of impending trouble. After proceeding about 25 miles, the train made its first station stop. When the engineman opened the throttle to leave town, the unit would not pick up its load. While the engine would run, it could not deliver power to the traction motors. The engineman phoned the diesel shop, saying: "I find the BF contactor doesn't pick up, but I can't find why. We need help."

Two maintainers drove to the dis-

abled train. Quickly they located the cause of the trouble with the BF contactor. Test yourself by guessing what was causing the trouble. There are several things that set up the circuit that causes the BF contactor to close. Any-one of several interlocks could cause such a failure. How familiar are you with them?

Remember the generator must be excited to do its job, but that maintainers must not get excited if they expect to do theirs. The electrician who found the trouble started checking interlock contacts that he knew were needed in the control circuit. When he checked the A-B interlock on the P2 contactor, it appeared to be in its *normally closed* position. To be certain it was making real contact, he moved the interlock. Immediately contact was made, enabling BF contactor to close. The generator was excited and the unit was ready for service. All that remained was for the interlock to be cleaned. Apparently, a speck of dirt had lodged between the contacts.

Don't get the idea that the A-B interlock on the P2 contactor by itself caused the closing of the BF contactor. It merely made it possible for ano set of contacts to energize the BF tactor. It works this way. The mally closed A-B interlocks on the set up the control circuit to th (shunt field) contactor. When SH energized, it closes its A-B interlo and they, in turn, energize the BF tactor.

While on the subject, it would well to consider some of the thi that could interfere with the BF tactor on GP-7 units that are equip with the Road Service Switch. H are the contacts that must be good make possible the closing of BF tactors:

- Isolation switch contacts mus *fully closed* in *Run* position.
- A-B interlocks on engine star contactors must be closed.
- A-B interlock on Ground R must be closed.
- G-H interlock on Parallel R must be closed. It closes LRC w the Road Service Switch is in *Swi ing* position. These same interlo close the SH contactor when the R Service Switch is in *Road* positi Then the A-B interlocks on SH energize BF.
- The A-B interlock on P2 must closed.
- The C-D interlock on LRS m be closed to energize the LRC tactor when Road Service Switch i switching position.
- When LRC is energized, it cl its G-H interlock to energize the contactor.

The LRS (Load Regulator Swi is tripped by the B finger of L Regulator when the Load Regul arm is standing in the "12-ocl position. This opens C-D interlock LRS which de-energizes LRC to out the "teaser circuit." The A-B terlock on LRS then closes, allow the generator shunt field contacto close. The battery field excitatio main generator remains norma cause the A-B interlock on SH tactor takes over the job of maint ing the circuit through the BF tactor.

This last may sound confusing mentioned only to clear up some qu tion that might be raised. The contactor circuit on the GP-7 uni not like that on road freight units as the F-3 and F-7.

Remember in any case that the g erator must be excited to perform duty, but the maintainer works be without excitement.

ɜport

(Continued from page 6)

ȝ truck frames and bolsters, and to ir tracks where it is often necessary to ɛ substitutions on foreign cars. Copies ꝛe Code at $1.75 each may be obtained ı the secretary, AAR Mechanical Divi- 59 E. Van Buren St., Chicago 5.

Articulated Flat ɾ in Operation

Rock Island is now moving farm equip- t out of the Moline-Rock Island-Daven- area on an articulated two-unit flat car. 50-ton, 46-ft units have a semi-perma- ASF connection similar to that used by Santa Fe on its piggyback articulated :ars (RL&C, Jan. 1960, p 35). A skirt ides continuity of side sills at the articu- connection. The units, which bear one ıumber, are 98 ft 11⅞ in. over coupler ng faces.

ood stringers on the cars are replaced two 3-in. Z-bars on each side of the :enterline. A new 2¾ in. Penta-treated deck is applied. The outer of four rows etractable anchors, 42 in. apart, are ɜd between the stake pockets. The inner are in line with the stake pockets. ;th of car over end sills is 95 ft 5⅞ in., width over decking is 10 ft 6 in. Trucks ɜquipped with 33-in. cast steel wheels, in. travel springs, and Barber lateral on devices.

ıe road expects to build 10 or 12 addi- ıl units this year.

McCormick Place: Site of Progress Exposition

McCormick Place and the nearby Illinois Central 31st Street Yard will be the sites of the American Railway Progress Exposition to be held in Chicago October 9 through October 16. Among the organizations meeting at that time will be the AAR Mechanical Division and the Coordinated Associations—Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers. It is expected that 300 companies will exhibit railway equipment worth $40 million. Late reports show approximately 225 companies signed up for space in McCormick Place and 40 companies in the outdoor exhibit area. IC 31st Street Yard is adjacent to the railroad's main line (lower left). Supply organizations which have combined to present exhibits are the Association of Track and Structure Suppliers, the National Railway Appliances Association, the Railway Supply Association, and the Railway Signal and Communications Suppliers Association. C. D. Buford, vice-president, Operations and Maintenance Department, AAR, is assisting the various groups in program and exhibit arrangements.

omotive Orders ı Upward

locomotive order backlog of 44 units e first of 1963 was almost 70% higher that at the beginning of 1962. Since 1, 1963, Railway Locomotives and has reported orders for more than units. Class I railroads installed ıew locomotive units (596 diesel- elec- 27 electric; 1 gas turbine-electric), and rebuilt diesel-electric, in 1962, accord- o the AAR yearly summary. In 1961, installed 250 new units (218 diesel- ric; 25 electric; 7 gas turbine-electric); 24 rebuilt diesel-electric. Of the 444 notive units on order Jan. 1, 1963, were diesel-electric and 13 electric. On 1, 1962, Class I railroads had 263 locomotive units on order, of which 222 were diesel-electric, 40 electric, and 1 gas turbine-electric.

Class I roads, according to the AAR summary, owned or leased 28,170 diesel units on Jan. 1, a decrease of 70 under Jan. 1, 1962. Steam locomotive ownership was reduced by 58 to a total of 21.

motive Ownership and Condition

	JAN. 1	
	1963	1962
	OWNED OR LEASED	
l (units)	28,170	28,240
ı locomotives	21	79
ic (units)	435	480
'urbine-electric	49	55
	STORED SERVICEABLE	
l (units)	678	637
ı locomotives	9	30
ic (units)	39	56
urbine-electric	6	24
	AWAITING SHOP	
l (units)	1,930	1,896
ı locomotives	10	39
ic (units)	69	58
urbine-electric	13	1

PRR Oil Test Report Available Through AAR

Mechanical Research Report No. OR-13, now available, covers a service test of Texaco, Dieseltex 1693 Diesel Engine Lubricating Oil conducted by the Pennsylvania Railroad test department. Test procedure conformed to AAR Test Manual MR-305 for conducting tests of diesel locomotive fuel and lubricating oils. Copies of the report, furnished to the AAR Research Center by the chief mechanical officer, PRR, may be obtained from the secretary, AAR Mechanical Division, 59 E. Van Buren st., Chicago 5. Cost, $2.50 to member roads; $5.00 to other than member roads.

Experimental 50,000-Gallon Tank Car Is Completed

An experimental 50,000-gal tank car incorporating special features for which patents are now being sought has just been completed by Union Tank Car Co. UT last year completed 990 new cars, including 106 built in Canada, representing its largest carbuilding program since 1957. "Just the number of cars does not tell the full story," says the company's annual report. Cars built in 1957 had an average capacity of only 10,098 gal, while those built in 1962 had an average capacity of 17,192.

This illustrates the trend toward larger cars which UT instituted a few years ago. It is in order to be prepared for a continuation of this trend that the 50,000-gal car was built by the research and development organization. Other development projects include work on cars designed to handle granular, powdered, or pelletized products.

Approved Brake-Cylinder Lubricant Withdrawn by AAR

The brake-cylinder lubricant, sanctioned for use on Jan. 1, 1963, and covered by Specification M-914-62 which was approved by letter ballot in September 1962, has been temporarily withdrawn by the AAR Mechanical Division. The Committee on Brakes and Brake Equipment had raised questions about this lubricant which led to the General Committee action. Pending a complete investigation of M-914-62 by the AAR Research Center and by the Brake and Specification Committees, car owners are permitted to use a lubricant, Molylube-80-Light or equivalent, which was approved early this year by the Brake Committee. Car owners not wishing to use Molylube-80-Light or equivalent can resume use of the M-914-42 lubricant, the previous standard and the only fully AAR approved lubricant in existence. The investigation of the M-914-62 lubricant is to be made "as quickly as possible."

Personal Mentio

R. M. Veenis
CNR

D. H. Decker
E-L

J. P. Knox
Frisco

B. R. Bishop
M-K-T

Bessemer & Lake Erie.—*Greenville, Pa.:* V
McNEILLY, chief industrial engineer,
pointed superintendent car departmen

Canadian National.—*Toronto, Ont.:* Ric
M. VEENIS appointed general superi
dent of equipment, Great Lakes Re
Mr. Veenis began work on the C
1938. He has served as superintende
motive power in Toronto, Montreal,
North Bay, Ont.

Canadian Pacific.—*Montreal, Que.:* Do
V. ROSE, supervisor diesel equipment,
lantic Region, appointed assistant w
manager, Angus Shops.

Central of Georgia.—*Savannah, Ga.:* W
LIAM J. LUCAS appointed to newly cre
position of equipment maintenance (
chanical) coordinator.

Chesapeake & Ohio.—*Grand Rapids, M*
H. H. LEE appointed assistant shop sc
uling engineer.

Erie-Lackawanna. — *Cleveland, Ohio:* D
DECKER, newly appointed assistant c
mechanical officer—car (Feb., p 49),
gan working with the former Erie Rai
as a trackman at Dunmore, Pa., in 1
His subsequent positions were carman
prentice; carpenter; car inspector; assi
to division car foreman; car forema
Huntington, Ind.; general foreman at D
more; division car foreman at Jersey C
shop superintendent, Susquehanna
coach shop, and supervisor of car rep
He was named assistant superintenden
department at Scranton, Pa., in 1960 fo
ing merger of the Erie and the Delawa
Lackawanna & Western.

Florida East Coast.—*St. Augustine, Fl*
E. HALES appointed general superinten
motive power.

sco.—*Springfield, Mo.:* J. P. KNOX ap-inted assistant chief mechanical officer. C. REDDICK appointed superintendent department, succeeding O. H. SUM-:RS, now assistant superintendent com-inications. J. H. HALL appointed assistant perintendent motive power, succeeding . Reddick. N. F. PHILPOTT appointed neral supervisor diesel maintenance, suc-eding K. I. DYCHE. WILLIAM L. JONES, ctrician, appointed diesel supervisor, orthern Division, succeeding E. W. RICE. *erman, Tex.:* K. I. DYCHE appointed ister mechanic, succeeding Mr. Hall *emphis, Tenn.:* E. W. RICE appointed as-tant master mechanic, succeeding Mr. ilpott.

J. P. KNOX, assistant chief mechanical icer, became a laborer at Springfield on ne 1, 1933. He subsequently held posi-ns as foreman, car supervisor, general eman, superintendent car department, d superintendent equipment.

ng Island.—*Morris Park, L. I.:* ROBERT W. ALLENDORF, assistant master mechanic, med general foreman, car shop, succeed-g CHESTER GRYZMALA who is on leave cause of illness.

ssouri-Kansas-Texas.—*Denison, Tex.:* B. R. SHOP, superintendent, Southern division, pointed chief mechanical officer, succeed-g RALPH O. JOHNSON, resigned.

w York Central.—*New York:* C. L. HALL, sistant general mechanical superintendent locomotives, appointed general supervisor comotive maintenance. W. L. O'CONNOR pointed supervisor locomotive mainte-nce. V. F. KANIA appointed supervisor car aintenance-special equipment; A. F. HAGY, pervisor car maintenance-passenger; and R. OLIVER, supervisor car maintenance-eight. *Cleveland, Ohio:* R. L. MARTIN pointed supervisor locomotive mainte-nce. Formerly general supervisor loco-otive maintenance at New York.

ntario Northern.—*North Bay, Ont.:* W. A. TCHES, formerly supervisor of motive wer, now chief mechanical officer.

What's New

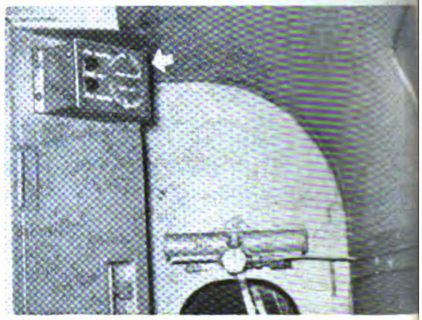
(Continued from page 14)

nspection Unit

he Uniflux Model 6-P-1, a 1,000-amp ortable, magnetic particle inspection unit, anufactured by Western Industrial Equip-ent Co., is for the detection of surface and

sub-surface flaws, cracks, porosity, no[n]metallic inclusions, and weld defects. Be[-]cause of its compactness, the unit can be used in many previously hard-to-reach, or inaccessible, areas. A six-position ta[p] switch increases flexibility in amperage se[-]lection, and automatic switching permi[ts] handling either 120 or 240 vac input lin[e] voltages without manual adjustment. Th[e] Unit weighs less than 63 lb. Uresco, Inc.

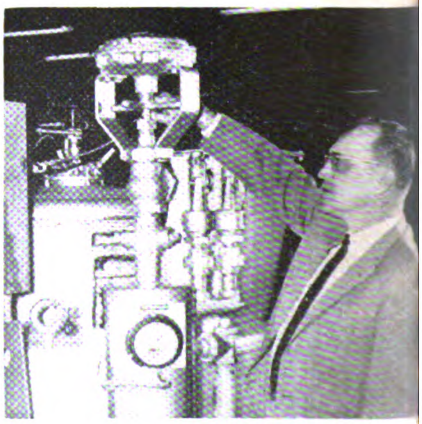
For more information, circle 4-15 on ca[rd] following page 50.



Ground Indicator

A glance at the P-M battery ground indi[-]cator will indicate the condition of the in[-]sulation in a locomotive electrical system. Current passing through electrical compo[-]nents of the device lights two 28-volt lamps, one indicating positive, the other negative. As long as the lamps continue to glow, th[e] resistance to ground is above a predeter[-]mined level. Resistance has dropped i[f] either lamp is out. The indicator weigh[s] 3½ lb. Paxton-Mitchell Co.

For more information, circle 4-16 on ca[rd] following page 50.

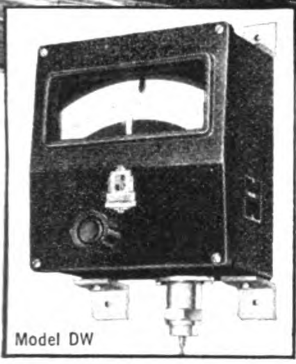


Stop-Check Valve

The AS-212 automatic air-operated sto[p-]check valve shuts off high-pressure stea[m] to 300 psi. It reduces steam pressure dro[p] by eliminating the trainline shut-off valv[e] and permits unrestricted flow, making mor[e] steam for heating purposes. The valve fea[-]tures stainless-steel parts and is offered wit[h] one or two push-button control panels. [A] manual shut-off hand is provided. Conve[r-]sion kits are available for S-212 valves. Vapor Corp.

For more information, circle 4-17 on car[d] following page 50.

Products Reference No. 47A



Model DW

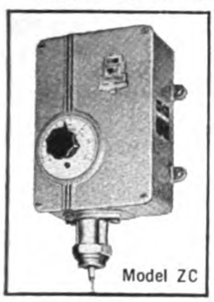
PARTLOW outnumbers all other temperature controls in reefers and piggy-backs

Riding the rails and keeping tabs on temperatures is a routine job for Partlow Controls. They outnumber all other controls because they *outperform* them.

Partlow designs controls specifically for reefer and piggy-back applications . . . the Model DW, for example.

This is a weather-resistant indicating control, primarily for outdoor installations such as control of reefers or trailers where a variety of refrigeration and heating stages is necessary.

Another is Model ZC, a non-indicating control equipped with two to five switches, making it possible to set up any combination of up to six functions to operate in sequence on rise or fall of temperature.



Model ZC

Mercury-actuated, ruggedly-built, Partlow Controls are uncomplicated mechanical instruments that withstand every road shock and vibration.

Write today for full details on Partlow Controls for rail and piggy-back applications. THE PARTLOW CORPORATION, DEPT. RL-43 NEW HARTFORD, N.Y.

PARTLOW

TEMPERATURE CONTROLS

Products Reference No. 47B

Cut "Clean-up" time in half... Make Freight car Markings cost less!

Because of its high paint-resistant qualities, stencils cut from *RESISTA-COTE* can be cleaned in half the normal time—or less. Effectively replaces and improves on oil stencil board and similar materials commonly used.

1. If paint is still wet, the stencil can be easily cleaned by blotting the paint with paper or newsprint. It is then as good as new.
2. If the paint is dry, the paint on the stencil can easily be peeled off in a fraction of the time normally required. Again the original stencil is as good as new!
3. Stencils cut from ***RESISTA-COTE*** can be used time and time again over a longer period.

When ordering, specify *RESISTA-COTE* Stencil Material for your freight car lettering and stencilling. Reduce clean-up time substantially and save the difference! Get better freight car markings in less time at less cost! Available in 36" width rolls or sheets.

***RESISTA-COTE* also ideal for lining spray booth walls and covering work areas where a "stick free" surface or finish is desirable.**

* Patent Applied For

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21433 MOUND ROAD • WARREN, MICHIGAN

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J. A. Carter
Oakite

R. P. Jones
Oakite

C. A. Danielson
Cardwell
Westinghouse

R. W. Porter
Thermo
King

OAKITE PRODUCTS, INC.—*Robert P. Jones,* vice-president, elected president and chief executive officer, succeeding *John A. Carter,* now chairman of the board.

CARDWELL WESTINGHOUSE CO.—*Carl A. Danielson,* executive vice-president, elected chairman and president, succeeding *John A. King,* retired. *Lloyd Cardwell* elected vice president-research and engineering, and *David S. Campbell,* vice president-sales.

THERMO KING CORP. — *Ralph W. Porter,* general sales manager, elected vice president for sales.

AMERICAN STEEL FOUNDRIES, SUBSIDIARY OF AMSTED INDUSTRIES.—*James W. Smith* named a district sales manager, Transportation Equipment Division, Chicago.

SKF INDUSTRIES, INC.—SKF has invested $2.5 million in a new Research and Development Center at Valley Forge, Pa., in addition to a new railroad journal-bearing manufacturing facility at Asheville, N.C.

BRENCO, INC. — *Nathan H. Turbeville, Jr.,* appointed sales engineer, covering Eastern United States.

KEYSTONE RAILWAY EQUIPMENT CO.—*Fred M. Groff* elected vice president-sales.

PITTSBURGH PLATE GLASS CO.—Paint and Brush Division now Coatings and Resins Division.

SUPER CO.—*Francis L. Schmale* is president of newly formed Super Co., at 20[illegible] Montgomery St., Fort Worth, Tex., supp[illegible]

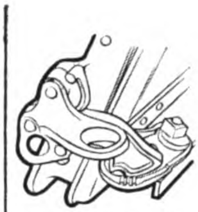
Products Reference No. 49A

SAVE 3 WAYS
with WINE APPLIANCES

1. **Precision Engineered and Cast** for faster, trouble-free installation.
2. **Quality Controlled From Start-to-Finish** for maximum dependability and longest life.
3. **One Source Buying Saves Purchasing Time...** insures parts match and equal quality.

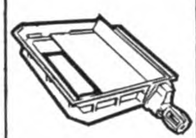
HOPPER DOOR FRAMES
—one piece, non-distorting

HOPPER DOOR HINGES
—accurate, single steel casting



DOUBLE HOPPER DOOR LOCKS
—extra strong, fully adjustable

SINGLE HOPPER DOOR LOCKS
—exclusive cam action, door held equally tight both sides

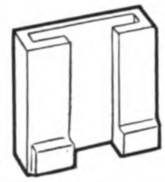


DISCHARGE GATES
—new direct drive, for 8" and 11" rail clearance

DROP END LOCKS
—hook type, for all drop end Gondolas

DROP BOTTOM BALANCERS
—spring hinge lets 1 man close heaviest door

DROP END BALANCERS
—close heaviest drop ends with ease



VIBRATOR BRACKETS
—four models, backs ground flat

LADING BAND ANCHORS
—swivel type with "drop flush" feature

CONTINUOUS LADING ANCHORS
—takes bands or wires, provides horizontal reinforcement

ROLLER SIDE BEARINGS
—single and double for any capacity car

BRAKE BALANCERS
—simple, positive, no dead lever connectors

Also...

Special Designs
—lading anchors precision cast to your specifications

Miscellaneous Car Castings
—for all types of freight cars; complete start-to-finish service from design stage to finished casting

WINE RAILWAY APPLIANCES

THE WINE RAILWAY APPLIANCE CO.
DIVISION OF UNITCAST CORPORATION
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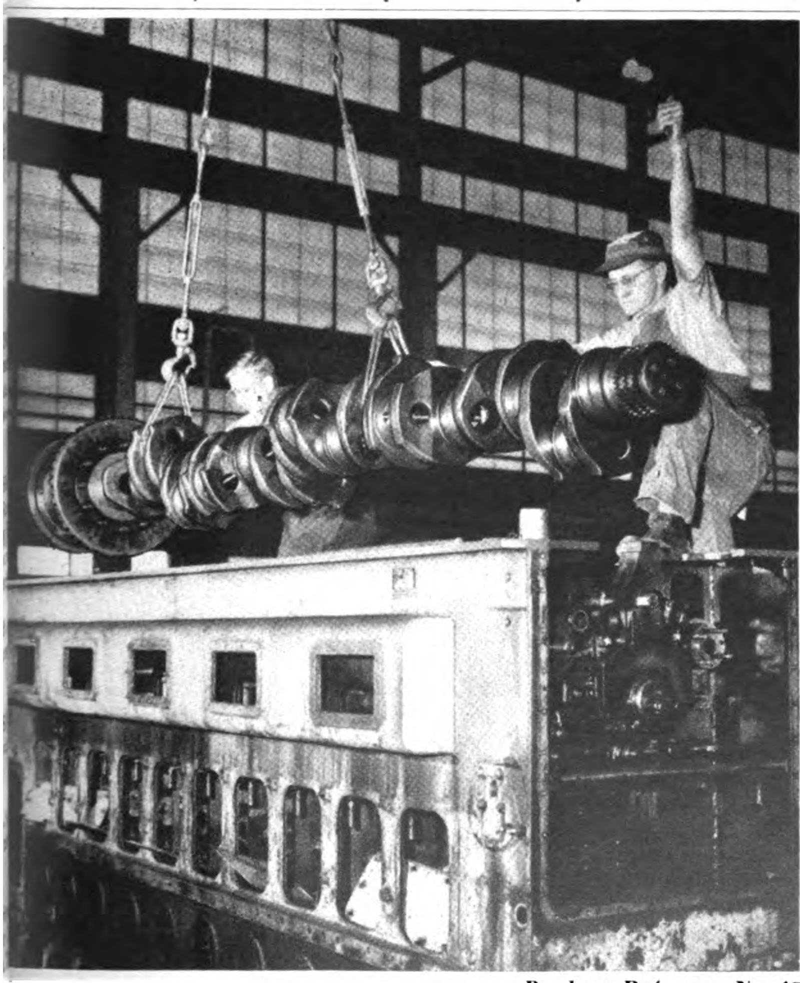

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of Double Seal piston rings, pistons, Eldorado remanufactured valves, chemicals, and replacement parts and equipment for locomotives and cars. Other officers are *Ray Schleihs*, vice president of field sales and service, 280 Walnut, Wellesley Hills, Mass.; *Ken Craig*, district manager, 1452 East Stanford St., Springfield, Mo. *P. V. Miles*, of P. V. Miles Co., is manufacturers representative at 1485 Bayshore Blvd., San Francisco, Cal., and *Clarence Turner* is manufacturers representative at Omaha, Neb.

JAMES G. BIDDLE CO.—*Philip E. Sellers*, vice-president in charge of sales, elected president to succeed *J. Robert James*, now chairman of the board. *Robert S. Kennedy* named sales manager to succeed Mr. Sellers. *E. E. Lange* named assistant sales manager and export manager.

K W BATTERY CO.—*Robert C. Cragg*, executive vice president, elected president, succeeding *Walter B. Loewenherz*, now chairman of the board.

ELECTRO-MOTIVE DIVISION, GENERAL MOTORS.—*W. J. Hynd*, senior analyst in sales department, appointed coordinator, sales administration.

CLINE TRUCK MANUFACTURING CO.—*Jack Hunter* of Frank B. Nugent Co., St. Paul, Minn., named representative for *Harry R. Bartell & Associates, Inc.*, handling Cline car department mobile service trucks and wreckers.

FANSTEEL METALLURGICAL CORP. —*Clifton H. Sass, Jr.*, operating as Mid-Control Co., 388 Cornell Ave., Des Plaines, Ill., named exclusive railway sales agent for Chicago based railroads.

Trade Publication

(To obtain copies of publications, c... corresponding numbers on card follo... this page.)

25. TUBE AND PIPE JOINTS. Cata... No. 818 gives specifications and dimensi... for Flexmaster tube and pipe joints—stra... joints, elbows, bulkhead joints, SAE O-Ri... flange adaptors, threaded adaptors, e... Aeroquip Corp.

26. METAL FLOORING AND STA... TREAD BUYER'S GUIDE. Bulletin ... contains data for selection and insta... tion of steel or aluminum flooring. I... cludes specifications and safe load tables ... 20 different types of grating, safety plate ... stair treads. Joseph T. Ryerson & Son, In...

27. SAFETY GRATING. Safety Handbo... No. 80 and Design Manual illustrates us... of Firm-Grip steel safety grating in co... veyors, catwalks, stairs and ladders. Bu... Steel Products, Inc.

28. COUPLERS. The OPW Kaml... Coupler Story booklet describes effects ... Military Specification MIL-C-27487 w... have on Kamlok couplers and adaptors f... hose and pipe. OPW Div., Dover Co...

29. GASKETS. Bulletin AD-214 descri... gasketing tapes, folded asbestos gaskets, a... gasketing coil. Garlock, Inc.

30. STEEL PLATE. Data sheets det... properties, production characteristics a... industrial applications of Bart nickel Lect... Clad steel plate, tubing, pipe, fittings, a... other products. Tank-car case histories al... included. M. L. Sheldon & Co.

Advertisers Index

ED WILLIAMS
METAL
PATTERNMAKER
WITH SYMINGTON
SINCE 1928

BEHIND HIS HAND AND EYE LIE
34 YEARS' PATTERNMAKING EXPERIENCE

A casting is no more accurate than the pattern from which it is made . . . and pattern accuracy must be built into it by the man who makes it.

One of the best is Ed Williams, whose specialty is metal patterns for truck frames, bolsters and couplers. Working with a variety of machine tools, he makes patterns which produce castings that have the dimensional accuracy required by the blueprint.

Ed Williams' experience, like that of other Symington patternmakers, is based on 5 years' apprenticeship, plus night school to learn mechanical drawing. He has been in the pattern shop since 1928. Today his ability is at its peak; he is among Symington's highly skilled craftsmen—men who make Symington railway products reliable.

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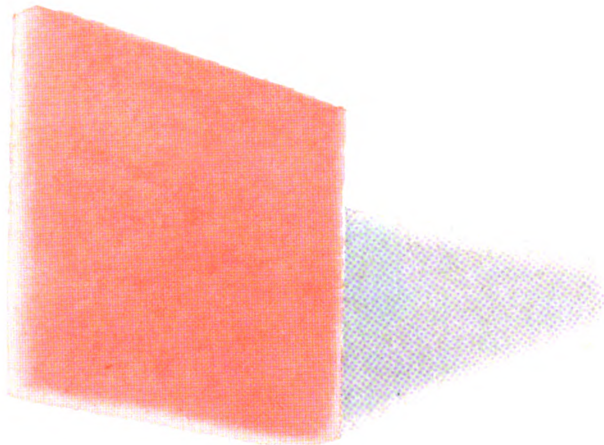
MAY 1963

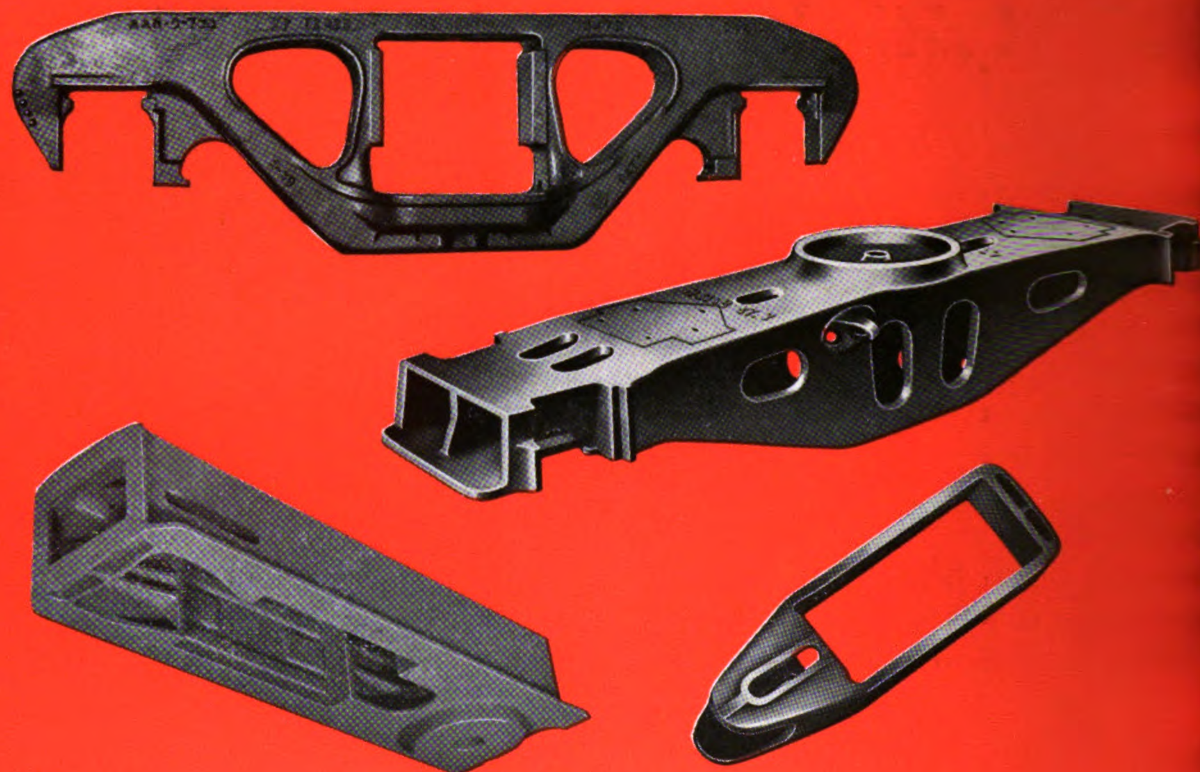
cp. Tr

Today's Approach to the Functions of the Mechanical Department

page 30

A Simmons-Boardman
TIME SAVER Publication





ILWAY
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America's Oldest Trade Paper
May, 1963—Vol. 137, No. 5

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Report

Diesel Repair Cost Trend Does Not Climb Steadily

Analysis of maintenance costs for the 146 diesel-electrics making up the motive-power fleet of the Central of Georgia indicates that there is not a steady upward trend in unit repair costs as was the case with steam locomotives. W.H. Mims, CG superintendent of motive power and equipment, and W.H. Leavengood, engineer maintenance methods, reported at last month's Joint IEEE-ASME Railroad Conference in Atlanta, Ga., that "retirement of otherwise serviceable diesel-electric locomotive units must be predicated on their inherent level of maintenance required rather than age only."

Applying the same methods used for analysis of steam locomotive repair costs by R.P. Johnson, former chief engineer of Baldwin Locomotive Works (The Steam Locomotive, Simmons-Boardman Publishing Corp., 1945), the two motive-power officers studied the actual costs for groups of various types of diesel-electric road and switching locomotives on their railroad. It indicated that, after four to six years, the trend for constant-dollar costs (corrected for inflationary effects) and, in most cases, for actual dollar costs, leveled or declined. For road-haul locomotives it was found that, while steam locomotive repair costs increased at a rate of 0.77 cents per 1,000 hp-miles per year, after the sixth year diesel repair costs actually decreased at the rate of 0.09 cents per 1,000 hp-miles per year and, in terms of constant-dollar values, decreased at rate of 0.22 cents per year.

It was pointed out that the growing proportion of railroad traffic moving on incentive rates and the declining proportion of high-rated commodities being handled can increase traffic so as to require additional motive power without producing a corresponding revenue increase. This means, it was concluded, that "additional power requirements facing many railroads will require careful analysis of existing operating costs to justify replacement of serviceable units which have inherently reasonable repair costs."

Cushion Underframes

Development of criteria for judging comparative performance of freight cars during impact has been the subject of a research program at the Hammond, Ind., research facility of Pullman-Standard. Three members of the P-S research and engineering organizations told the Conference that work done during 1962 justified an earlier hypothesis that there might be a way to relate coupler force to lading force for cars fitted with hydraulic cushioning. It had been recognized several years ago that cars with relatively short cushion travel could produce radical reductions in coupler forces without a corresponding decrease in lading forces — those which produce damage to shipments.

Coupler forces are easy to measure, and it was finally found that average coupler force (averaged over the sill travel) could

be correlated with impact effect — a measure of the kinetic energy which must be absorbed (but not necessarily dissipated) during the coupling of a moving and a standing car.

Conclusions of the entire program, which utilized a cushion-underframe, insulated box car with canned-goods and steel-billet ladings, were:

• At impact speeds below 5 mph for the 20-in. cushion or 6 mph for the 30-in. cushion, end-wall lading forces are negligible since floor friction is sufficient to accelerate the lading. At some point over these impact speeds, depending on impact intensity, the lading will be compressed against the end wall with a force which is at least twice as great, possibly many times as great, for the 20-in. as for the 30-in. cushion. A 30-in. cushion more than doubles the protection given to lading by the 20-in. cushion.

• The unit end-wall force will be much higher for light loads than for heavy loads. Loading a car to capacity should actually reduce the likelihood of lading damage.

• The total peak end-wall force is a function of the average input force to the carbody, provided there are no peaks in the input force toward the end of the stroke. Also, this average input force can be measured at the coupler and bears a fixed relationship to the impact intensity, dependent on cushion travel.

Support Bearings

General Electric has done considerable research as to how axle journal finish affects the performance of traction-motor support bearings on locomotives. This has involved the selection of an accurate method for measuring the surface finish, a device known at the Talysurf, and the specifying of a method for producing a satisfactory finish (RL&C, Nov. 1962, p 28).

The investigation has produced several conclusions. A bearing of the axle-support type can run at the low friction coefficients associated with hydrodynamic operation in which the load is "floated" on an oil film. Coefficients below 0.01 were attained at speeds of 38 fpm, with coefficients essentially independent of loading. Values below 0.005 were measured at higher speeds. This results in low heat generation and high load capacity.

The oil film in this type of bearing is very thin because of the high unit loads and low speeds. In such an application, hydrodynamic operation requires smooth journal and bearing surfaces that do not have high peaks to penetrate the thin oil film. Greater smoothness showed improvement in capacity over rougher journals. At or above this level no indication was found that roughness is necessary or effective in improving bearing load capacity by virtue of bringing more oil to the bearing surface. In operation, the journals and bearings wear to very smooth, cylindrical surfaces. Some journals originally have circumferential waves on the surface. These apparently do not seriously affect the load capacity of a new journal. However, the long wave length was found superior to the shorter wave length.

Bearing failure can occur in two ways: by large friction forces displacing the bab-

(Continued on page 46)

1963 Track Exhibits To Be at IC's 31st Street Yard

Track exhibits for the American Railway Progress Exposition next October 9-16 at Chicago will be displayed at the Illinois Central's 31st Street Yard. This is the same location used for the September 1961 track exhibits of the Allied Railway Supply Association shown in the illustration. Track space has been increased from the 4,500 ft available in 1961 to 7,000 ft for the 1963 exposition. Already 6,300 ft of this space has been taken by track exhibitors. Late reports show 268 exhibitors have taken space either indoors at McCormick Place, or at the 31st Street Yard.

Orders and Inquiries for New Equipment

Placed Since Closing of April Issue

Locomotive Orders

BELT OF CHICAGO.—*Electro-Motive:* 3 SW-1,200-hp switchers equipped with m-u controls. For June delivery.

FRISCO.—*General Electric:* 8 2,500-hp, low-hood type U25B diesel-electric locomotives. For third quarter delivery.

LOUISVILLE & NASHVILLE.—*Electro-Motive:* 20 general-purpose 2,250-hp GP-30 diesel-electric locomotive units. *General Electric:* 4 2,500-hp U25B diesel-electric locomotive units. The 33 units will replace a similar number of the road's older F-3 and F-7 diesels. Delivery of units to begin this month.

ROCK ISLAND.—*General Electric:* 12 2,500-hp U25B diesel-electric locomotives for main-line freight service. Delivery to begin this month.

Freight Car Orders

ATLANTIC & WEST POINT—WESTERN RY. OF ALABAMA.—*Pullman-Standard:* 40 70-ton, 50-ft 6-in. cushion underframe box cars—20 for A&WP; 20 for WRA. Total cost, $600,000. For delivery this month.

FRUIT GROWERS EXPRESS.—*Company shops:* 377 RB and RBL bunkerless insulated cars with hydraulically cushioned underframes with 20-in. travel, 10-ft doors, lading protection devices, side fillers, special flooring, and roller bearings. Cost, approx. $7 million.

ILLINOIS CENTRAL.—*Company shops:* 200 70-ton box cars with cushion underframes. Cost, $2.4 million. Delivery to begin in June.

LOUISVILLE & NASHVILLE.—*General American:* 5 100-ton, 4,180-cu ft Airslide covered hopper cars. Cost, $102,566. Delivered in March. *Company shops:* 50 70-ton, 53½-ft bulkhead flat cars with General Steel cast-steel underframes. Cost, $783,-750. For completion this month.

MAINE CENTRAL.—*Magor:* 200 50-ft, 70-ton box with aluminum roofs and 9-ft doors. Fifty will have cushion underframes. For September delivery. Cost, over $2.5 million.

NEW YORK CENTRAL.—*ACF:* 12 100-ton covered hoppers. Cost, $152,000.

NORFOLK & WESTERN.—*Company shops:* 1,500 85-ton roller-bearing hopper cars. Cost, $16.3 million. Completion expected by late June.

ST. LOUIS-SAN FRANCISCO.—*General Steel Industries:* 50, 53½-ft, 70-ton bulkhead flat cars equipped with one-piece cast-steel underframes and upright ends, and fitted with tie-down equipment. Cost, approx. $861,000.

SANTA FE.—*Company shops:* 50 60½-ft, 100-ton box cars. For November delivery.

Notes and Inquiries

Alco Products, Inc., and *Maschinenbau K... (Mak)* of West Germany have signed an agreement calling for the building in the U.S. of a number ... prototype diesel-hydraulic locomotives, embodying Mak features. Principal design involved is ... 4,400-hp multiple-purpose unit.

The *Canadian Pacific* is placing in high-speed freight-train service three upgraded diesel-electric units. Two are GP-30 diesel electric units upgraded by General Motors Diesel from two GP units delivered to the CP several years ago. The third ... 2,400-hp DL-640-A converted from a 1,600-hp ... by Montreal Locomotive Works.

The *Iron Ore Co. of Canada* has received delivery of five electric locomotives which, to simplify mine ventilation problems, are being substituted for the four GP-9 diesel electrics which have been powering automated ore trains over a ... mile route at Labrador City, Newfoundland (RL&C, Oct. 1962, p 17). The 1,200-hp, ... **electrics, constructed by General Motors Diesel Ltd., will be fitted with automatic controls.**

The *Maine Central* has leased 200 reconditioned 40½-ft box cars "to relieve a serious shortage of freight cars at the mills of Maine's largest industries." The cars, formerly in service on the ... ing, were obtained on a 10-yr lease. Now being delivered.

The *New York Port Authority* received bids April 23 for 250 rapid-transit cars for service on the former Hudson & Manhattan line. Although the Authority is still awaiting a U.S. Supreme Court ruling on the legality of its take-over of the H&M (RL&C, April, p 6), it is going ahead with plans for a three-month evaluation of the bids ... contract will be awarded when the Authority is in a legal position to do so.

The *Pennsylvania* is adding to its New York-Philadelphia-Baltimore-Washington day and ... ning trains 50 coaches rebuilt from stainless-steel body structures of roomette sleeping cars built by Budd and leased to the Pullman Co. a few years ago. Cost of conversion will be about $70,... per car. Also to be rehabilitated, at a cost of ... $1,400,000, are 24 reclining-seat overnight coaches, 12 dining cars, and 150 mail and express cars. Conversion work on the roomette cars will be done partly in road's Altoona, Pa., works and partly at the Budd plant in Philadelphia. At Altoona interior partitions, roomette furnishings, plumbing and other fixtures, will be removed, and air-conditioning and electrical equipment, running gear and air brakes reconditioned. Balance of work will be done by Budd. All are scheduled for service by mid-November.

The *Reading* plans to purchase 56 new ... electric locomotives at a cost of approximately $11 million.

The *Western Pacific's* directors have authorized the purchase of new equipment to cost an estimated $2,687,000. Included are 10 2,250-hp ... electric locomotives.


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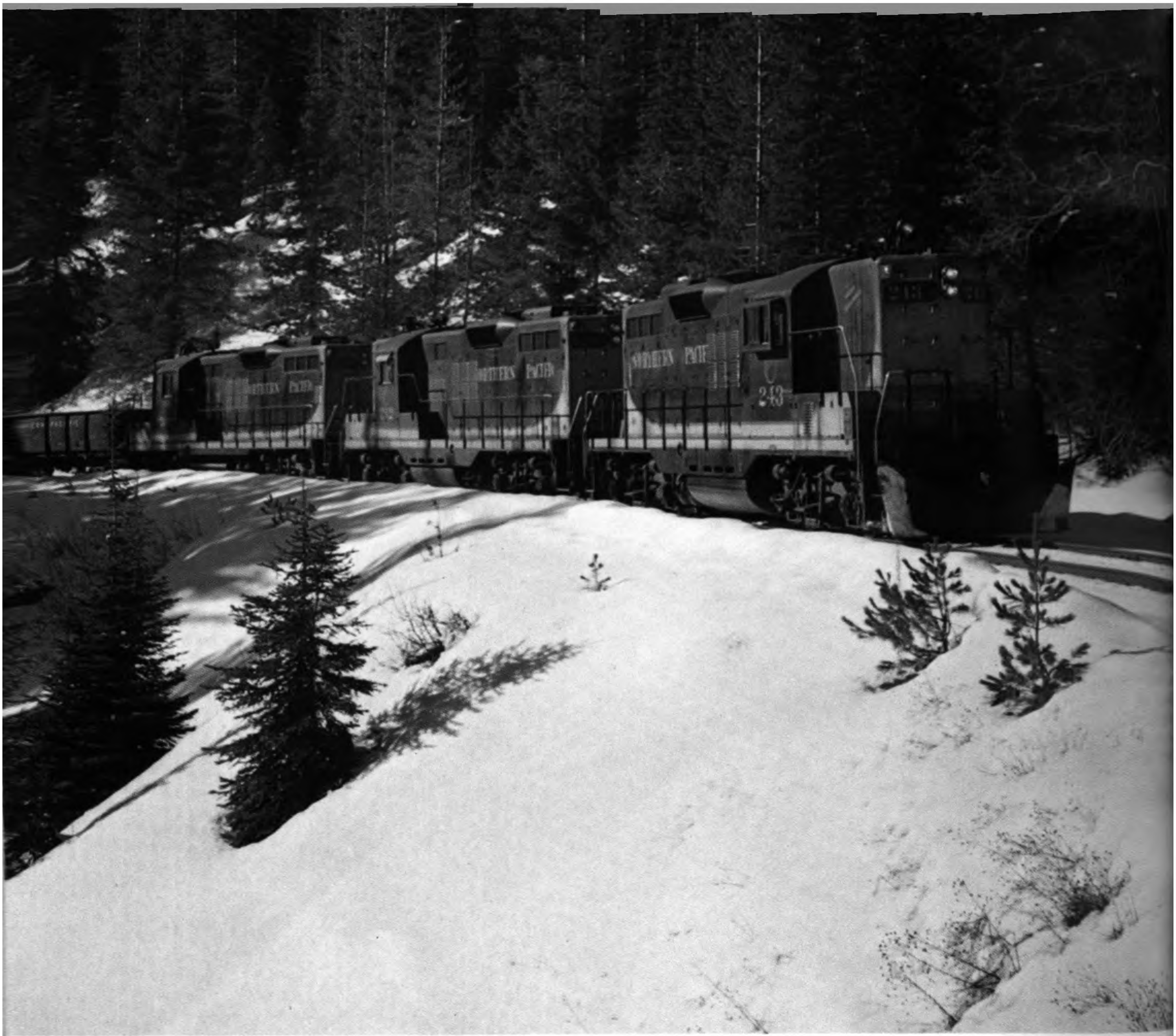
N&W

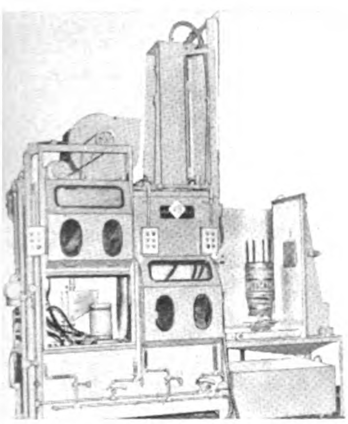


What's New in Equipment

ıin-Line Gauge

: need to close angle cocks, break es, and check for pressure at ten or more intervals is eliminated with the Peacock 1460 trainline gauge. Gasket guard No. 5 is inserted between coupling, then a h down on top of unit itself inserts a dle between coupling gaskets and train- pressure can be read from face of :. The device, according to manufactur- reduces train-line leak detection time at least 75%. Ellcon-National, Inc.

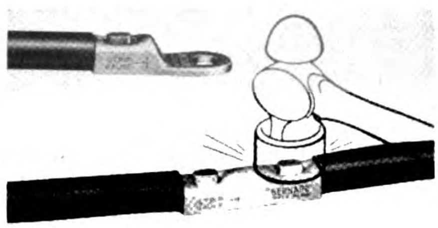
'or more information, circle 5-1 on card owing page 52.



ɔning Machine

ıng the Vapor blast liquid honing ma- ne, diesel liners can be refinished and bon removed from diesel pistons in 5 ı, according to the manufacturer. One ge is especially designed for refinishing ome-plated liners after they have been ar polished to restore oil retention. The :r to be finished is placed on a revolv- turntable inside the machine. While it olves, two guns enter the inside of the :r, removing the wear polish and re- ring oil-retentive qualities to the finish. :aning of pistons and intake and exhaust ves is an automatic operation. The pis- ı is placed on a revolving turntable in : machine and, as it revolves, a cleaning ı moves down the outside face of the ton. Following this two additional guns are actuated to clean carbon from all ring-groove surfaces, while another gun is cleaning the piston from the inside. The top of the piston is cleaned with a manually operated gun. One man can load and unload the piston cleaning stage. Vapor Blast Manufacturing Co.

For more information, circle 5-2 on card following page 52.



Cable Connectors

With a few sound hammer blows the built-in malleable punches of the Hammer-On cable connectors are said to make a solid connection between cable and connector for greater pull-out strength and higher electrical conductance. Short cable lengths can be salvaged with the Bernard cable splicers which have a barrel with a straight-through bore and are equipped with a malleable punch at each end. With cables secured, they form tight, compact connections that are easily insulated. Hammer-On cable lugs can be bent without breaking to produce any angle up to 45 deg. Both cable lugs and splicers have a premarked stripping gauge that shows how much of the cable jacket to remove for a snug fit. Bernard Welding Equipment Co.

For more information, circle 5-3 on card following page 52.

Floor Topping

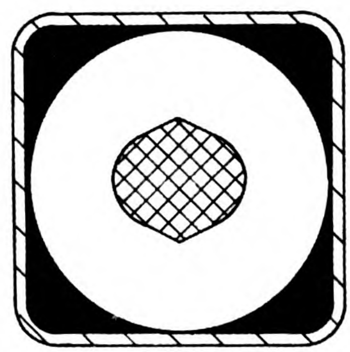
Box car and trucking floors are among the areas in which Resiweld floor topping is said to have withstood rigorous experimental tests. The product is an epoxy-based compound that bonds permanently to nearly all types of floor surfaces. With silica sand added, a safe, non-skid surface is obtained. Dry concrete coloring pigments may be added. The topping can be applied in any thickness from 1/16 to 6 in. or more. H. B. Fuller Co.

For more information, circle 5-4 on card following page 52.

Center Plate Lubricator

SPC Dri-Lub center-plate shims are made of 16 gauge, special tempered spring steel, with molybdenum dilsulphide fused to both sides. They are said to economically lubricate center plates and to reduce center-plate galling and seizure, as well as wheel flange, rail and truck wear. Car sets of four 13½-in. diameter shims are available for 70-ton capacity cars and larger. Spring Packing Corp.

For more information, circle 5-5 on card following page 52.



Storage Battery

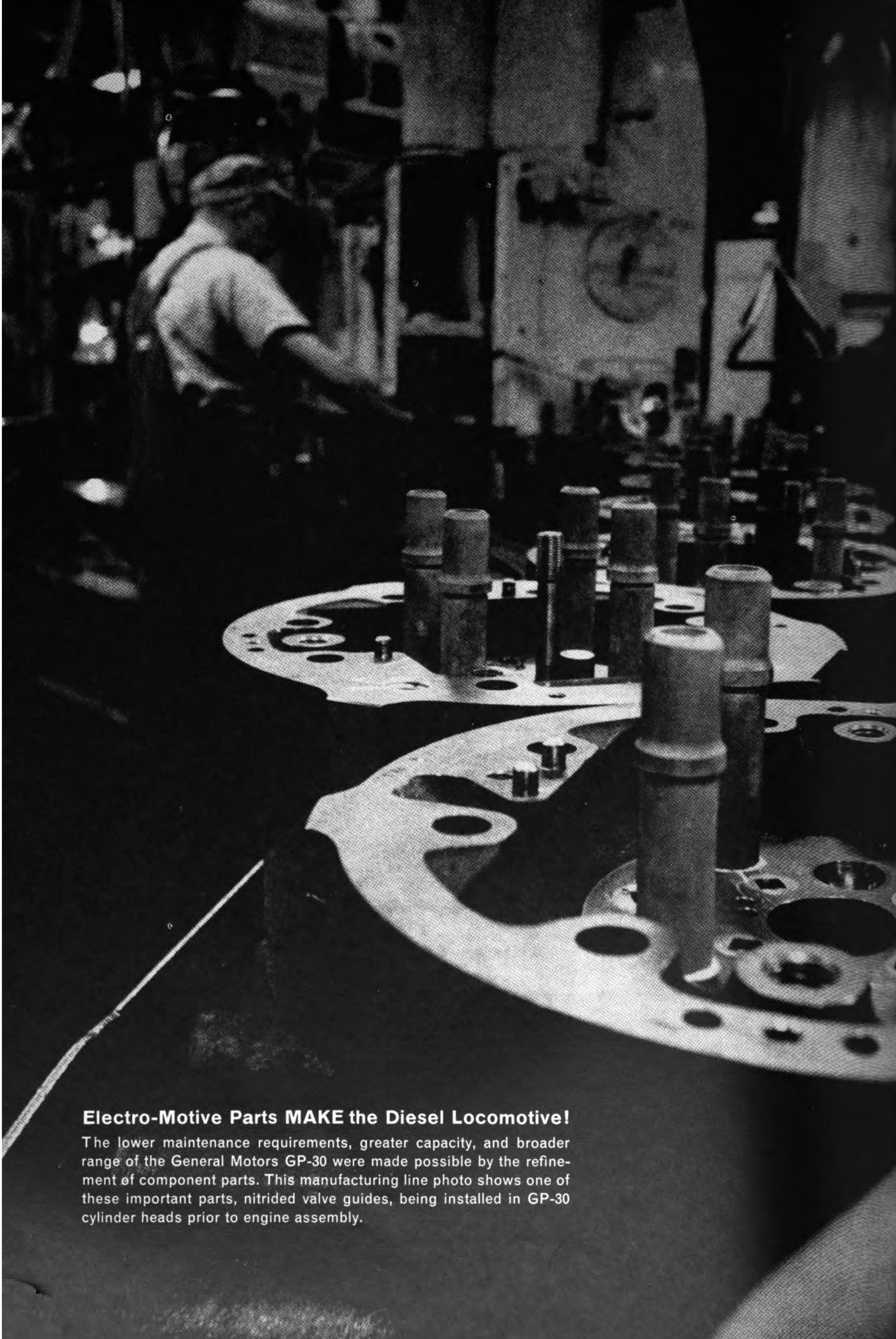
A power boost averaging 18% in Exide-Ironclad lead-acid motive-power batteries has greatly increased the potential usefulness of most electrically powered material-handling vehicles, all at reduced costs per ampere-hour, according to the manufacturer. The batteries can be had in sizes matching the electrical capacities of physically larger existing models. Included in this Diamond Jubilee line are five new models which utilize square-, instead of round-, shaped higher-porosity tubing that gives added power by providing more active material (shaded area in cross-section shown) at grid spines. All capacity ratings of the models are based on the 6-hr rate of discharge with full initial capacity at 1.275 to 1.285 specific-gravity electrolyte. Electric Storage Battery Co.

For more information, circle 5-6 on card following page 52.

Cleaning Pumps

The Topper high-pressure, air-operated pumps are said to be particularly suited for heavy-duty railroad cleaning operations. Pressure ratios range from 2:1 to 10:1, developing a high-velocity spray action that readily removes dirt, grease, and other soils from equipment surfaces. Strong acid or

(Continued on page 14)



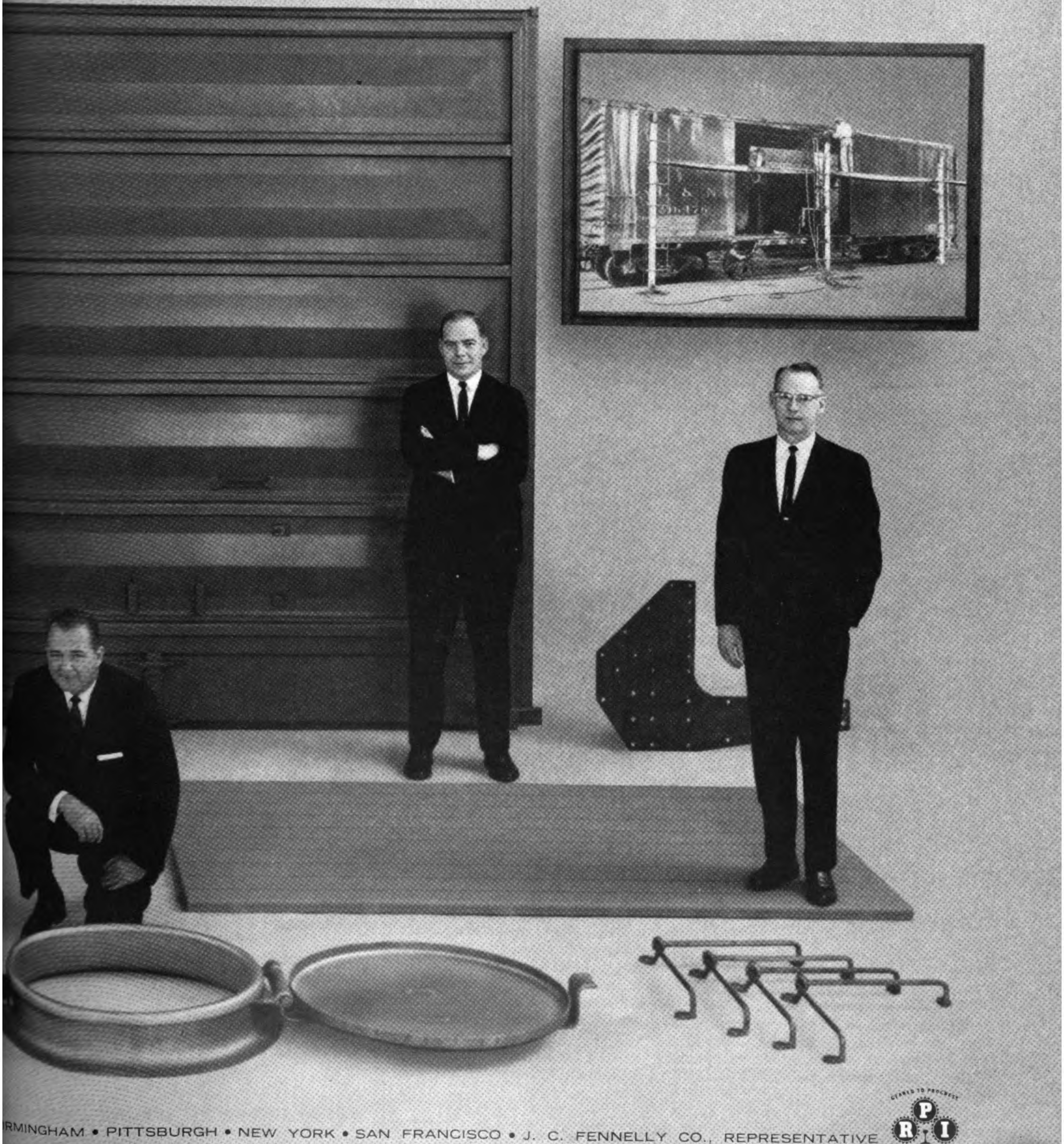
Electro-Motive Parts MAKE the Diesel Locomotive!

The lower maintenance requirements, greater capacity, and broader range of the General Motors GP-30 were made possible by the refinement of component parts. This manufacturing line photo shows one of these important parts, nitrided valve guides, being installed in GP-30 cylinder heads prior to engine assembly.

ere's what the P-S Parts and Service division can do for your railroad. It can provide complete line of car parts built to P-S specifications or your own. Or it can engineer, bricate and schedule complete rebuilding, upgrading or car conversion programs in ilroad shops or in P-S carbuilding facilities. It can repair damaged equipment, build rts for new car fabrication, or provide stock parts for rip track repair. And it can ar- nge delivery of parts to the precise timing of your program's requirements. **Interested?** et this new Pullman-Standard division show you the advantages of dealing with a single urce for all of your parts needs. Call or write a P-S Parts and Service representative. He ill demonstrate the economies of conversion and rebuilding programs in your shops or rs . . . and he will explain what P-S rts and Service really mean in terms skill, know-how and experience.

PULLMAN-STANDARD

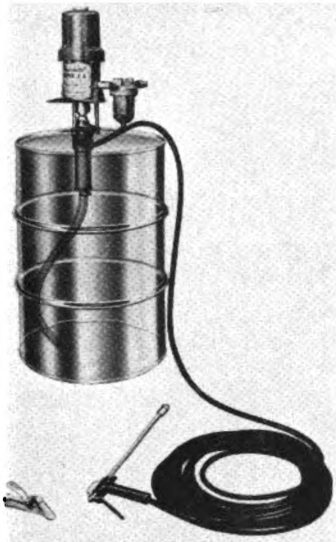
A DIVISION OF PULLMAN INCORPORATED



RMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO • J. C. FENNELLY CO., REPRESENTATIVE

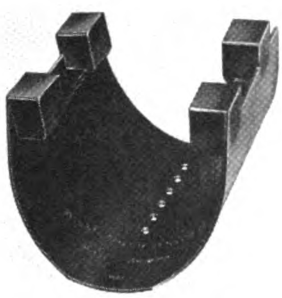
What's New

(Continued from page 9)



alkaline solutions can be used for paint stripping, degreasing, carbon removal, or descaling. Two stationary and three portable models are available. Wyandotte Chemicals Corp.

For more information, circle 5-7 on card following page 52.



Journal Stop

The Security Buma "N" Journal Stop is said to provide maximum stabilization for journal-box components. The one-piece unit locks in place by straddling the journal-box columns. Installation is made without dismantling truck side frames. The stop has AAR approval for test in interchange service. It may be installed with any lubricator; the rubber mat is said to protect pad bottom against wear and tear. Security Railway Products Co.

For more information, circle 5-8 on card following page 52.

Current Limit Control

The Model CL101 solid state current limit control is an accessory to the Model 101 series solid stage voltage regulators for 37-, 75- and 125-volt auxiliary generator charging systems. It is exeternally adjustable between 50 and 400 amp and is adaptable to all current limit applications. Used in conjunction with the Model 101

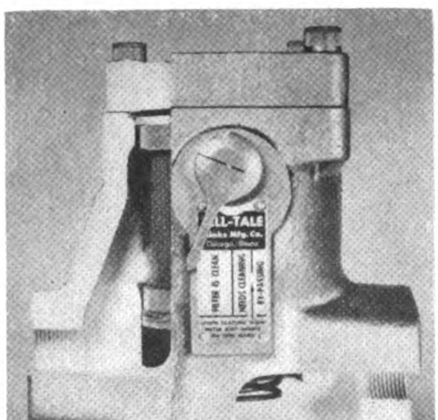
series, it replaces the limiting resistor and/or measuring shunt required on most auxiliary systems. A positive current limiting action prevents fuse blowing or equipment damage due to over-current conditions. Heat dissipation is 15 watts. Thomas A. Edison Industries.

For more information, circle 5-9 on card following page 52.

Lubricative Coating

The Type 522-X Molykote lubricant is a grey-white, free flowing powder which is inert to practically all chemicals and solvents. The powder may be applied by rubbing onto any clean, dry surface. Used as an additive, the lubricant is said to be compatible with all materials and easily dispersed in water, oils, greases, solvents, plastics and elastomers. Alpha-Molykote Corp.

For more information, circle 5-10 on card following page 52.



Paint Filter

Interchangeable, reusable cartridges designed to handle varying particle sizes in metallic and acrylic paints, lacquers, primers, and sound deadeners feature the Tell-Tale paint filter, the indicator arm on which shows when the filter needs cleaning. A screw-on cover is removed to facilitate clean-out or changing of screens which are available to handle particle sizes of 50, 74, 149, 238 and 297 microns. For conventional painting, pressure rating is 150 psi maximum; for airless installations, 3,000 psi maximum. Models handle from 5 to 500 gpm. Binks Manufacturing Co.

For more information, circle 5-11 on card following page 52.

Welding Attachment

The splatter of weld metal heretofore inherent in stud welding is said to be virtually eliminated with the Tranquil-Arc attachment developed for use with NS-10 welding guns and other semi-automatic end-welding equipment. The attachment retards the rate of speed at which the fluxed end of the stud is lowered into the molten pool of metal during the arcing cycle. Its "tranquilizing" action permits precise control of the weld fillet size and shape "in the interest of better weld quality and more efficient use of welding power." Nelson Stud Welding Division.

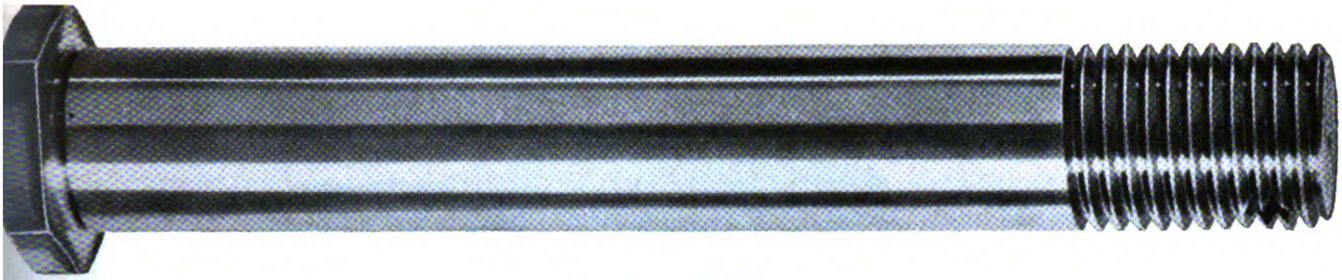
For more information, circle 5-12 on card following page 52.

Alertness Control

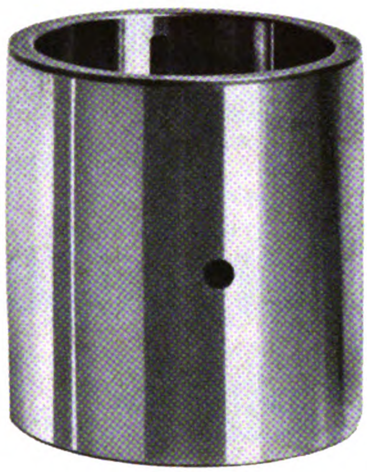
A movement circuit, timing circuits, and visual and audible warning devices comprise the Alertor electronic control which is said to monitor and insure engineman's ability to do his duties. The device senses normal movements, such as touching the brake levers or window sill, or getting in and out of seat. If no involuntary action occurs for a period of 20 sec, an audible and visual signal is actuated and, after an additional 10 sec, a service application of the brakes will occur. Performance of the device on 16 diesel freight locomotives of a western railroad is said to have been quite satisfactory. Vapor Corp.

For more information, circle 5-13 on card following page 52.

[TURN TO PAGE 46]

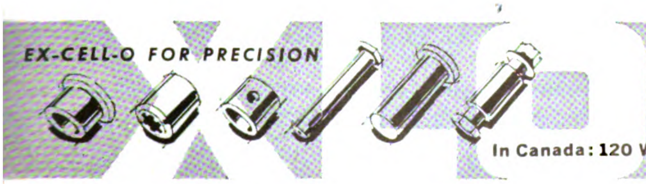


(and 534 sizes in between ready for immediate delivery)



Need pins or bushings? Need them *now*? Call Ex-Cell-O. Need a source with a wide range of sizes? Call Ex-Cell-O. Need a supplier who maintains such a vast stockpile that you can cut your own inventory to a minimum? Call Ex-Cell-O. ▪ Today, more than 200 U.S. and Canadian railroads do just that. Ex-Cell-O's 35-year specialization in the manufacture of pins and bushings for all types and makes of locomotives and passenger cars, plus high-volume production equipment and extensive warehousing facilities enable you to get the parts you need, when you need them . . . and at a low cost. ▪ Install them . . . forget them. Electronically controlled heat treating, "Diamond-hard" deep steel casing, super-fine finish, and ductile core provide greater resistance to wear, abrasion and shock . . . giving you very often up to a million miles of trouble-free service. ▪ For proven product quality, unmatched inventory, prompt delivery service . . . and for dedicated service to the carrier, contact Ex-Cell-O. Either your local Representative or Ex-Cell-O direct. But do it today.

62-63 RR



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Railroad Division

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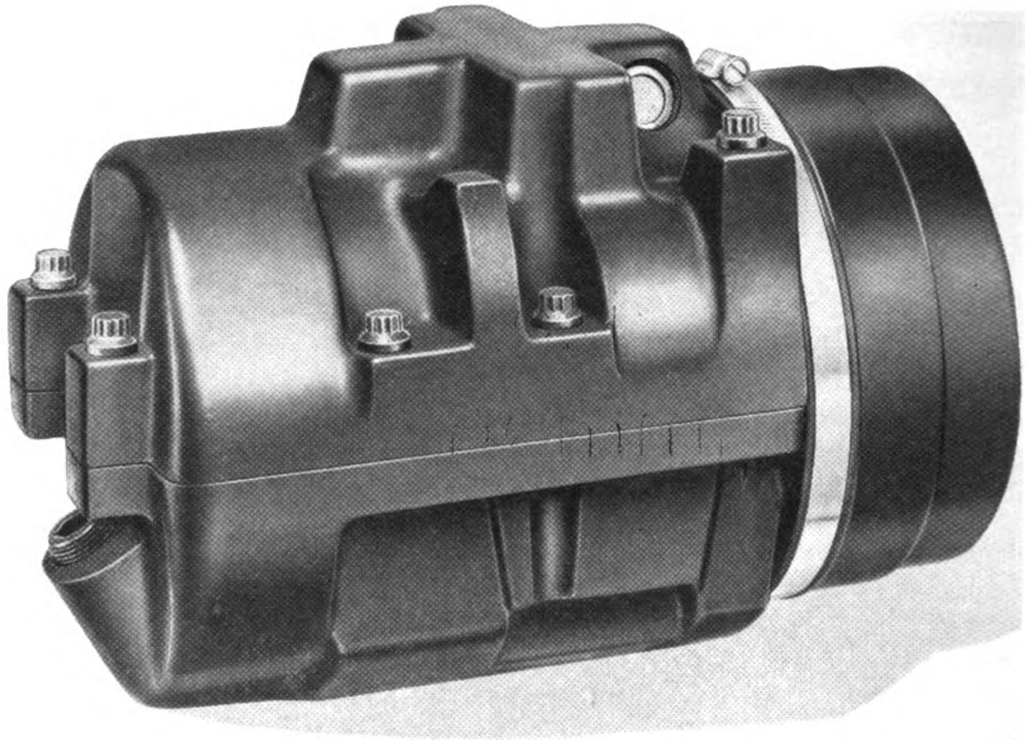

This CLEVITE cartridge journal bearing takes the heaviest loads and impacts easily and dependably. Recent increases in freight car capacities are handled with no reduction in bearing life. Write:

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CLEVELAND GRAPHITE BRONZE

DIVISION OF CLEVITE CORPORATION, 17000 ST. CLAIR AVE., CLEVELAND 10, OHIO. IN CANADA: CLEVITE LTD., 1177 TALBOT, ST. THOMAS, ONTARIO

RPI MEMBER

Editorials

\echanical Conventions

ıestions have been asked about a permanent change in ıual meeting dates of mechanical department associans because of the American Railway Progress Exposin next October 9-16. It should be kept in mind, howɜr, that the mechanical department associations, and we ıume the other participating organizations, will return in 64 to their regular annual meeting schedules.

Next year, the AAR Mechanical Division will hold its nual meeting in June as it has done in the past. The ɔordinated Associations, comprised of the Locomotive aintenance Officers, Car Department Officers, Air ake, and Railway Fuel and Operating Officers associaıns, will meet in September, their normal convention ɔnth.

The exposition this October is somewhat of an experiɜnt although current interest in it, reported elsewhere this issue, indicates that its success is assured if particiıtion in exhibits and by railroad associations is used as yardstick. An evaluation will be made after October 16 ıd on the basis of this assessment a decision will be made ı holding another combined show. If favorable, it is our ıderstanding that the exposition would probably be held ;ain but only once every five years.

'ast-Moving Developments

ı every phase of railroading there is stepped-up activity rected at bolstering the railroads' competitive position. ast-moving developments are changing and will continue change the railroad situation and this is especially true motive power and freight cars.

The Locomotive Maintenance Officers Association has ːt up an excellent program for their October annual meetıg aimed specifically at airing the maintenance troubles ɜculiar to "higher-horsepower" locomotives and their ːmedies. This program could very well be a continuing ıbject for future meetings because all domestic builders ːe reportedly designing or building diesel-electrics up to ,500 horsepower, more than double the capacity of curːnt models. And let's not forget the 4,000 or more horseower diesel-hydraulic designs, one domestic and one ɔreign, that will be on American rails by mid-1964. Furıermore, we are pretty sure that these sharp increases in nit horsepower are not the last increases to be made.

The same trend applies to freight-car developments. ·verything is getting bigger. The Southern has cars like ıe 100-ton covered hopper called "Big John", the 100-ɔn hopper called the "Big Dropper" and the 92-foot box ar called "Big Boy". We just got accustomed to the 0,000 and 30,000-gallon tank cars when the 50,000-allon tank car described on page 42 of this issue, which ɾe call a "whopper", broke into the news. These cars are nly a few examples of what is being done and are indicaive of the changes being made in car design to reduce costs, lower rates, and improve the railroads competitive position.

Prior to rapid equipment developments there had to be a change in thinking on the part of railroad men. In the mechanical department we believe that the basic equipment management functions partially responsible for and geared to these changes have been ably presented by J. H. Heron, assistant vice president—equipment, New York Central, as reported on page 30 of this issue.

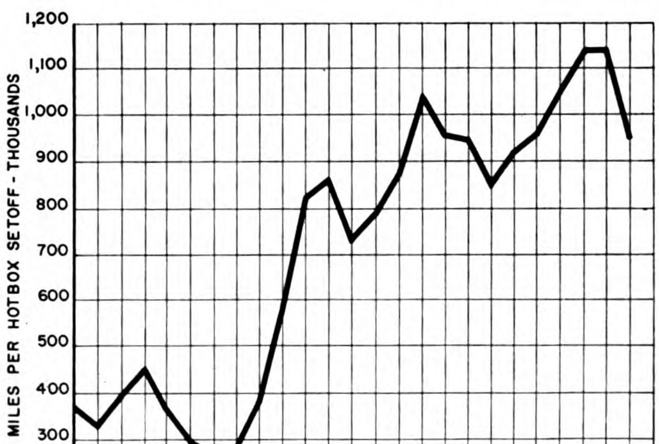
This activity in adopting new ideas and new concepts is most heartening to railroaders who have been for too long on the defensive. We hope it continues because an attack develops a fluid situation in any combat.

The Hotbox Situation

We believe, as the AAR Research Department does, that much greater hotbox mileage per setoff can be accomplished. The chart shows the fine progress made during the past two years. The 1962 average was 942,637 miles per hotbox setoff, almost 2½ times the average setoff mileage of 1961.

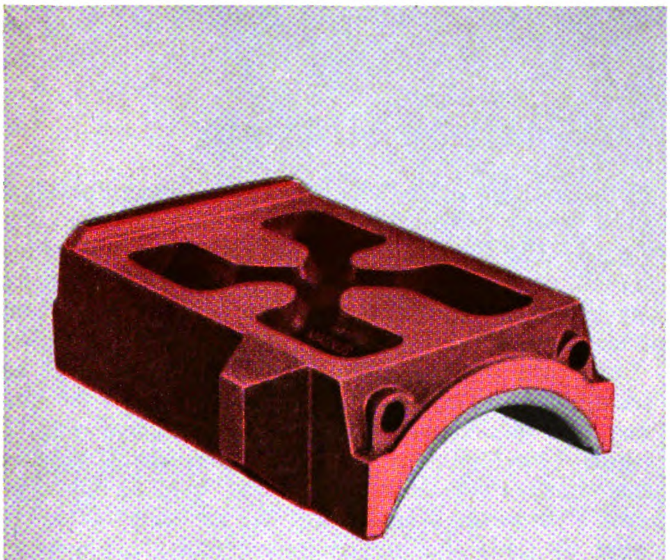
After the last three 1962 months produced over an average one million miles per setoff, we expected the January 1963 data to continue the trend. Compared with the January 1962 mileage of 728,992, this year's January data shows a substantial increase to 954,270 miles per setoff. Yet we are disappointed. We are disappointed because we know that the equipment and know-how are available to keep the curve moving upwards.

We do not know the reasons for the decrease from the previous three months. Perhaps quality is being sacrificed for price in the purchase of lubricators. Maybe there are too many pads in service from which approval has been withdrawn. Possibly the lubricating devices are being renovated too many times. Regardless of the reasons, we are looking for an upward trend toward the two-million miles per setoff goal.

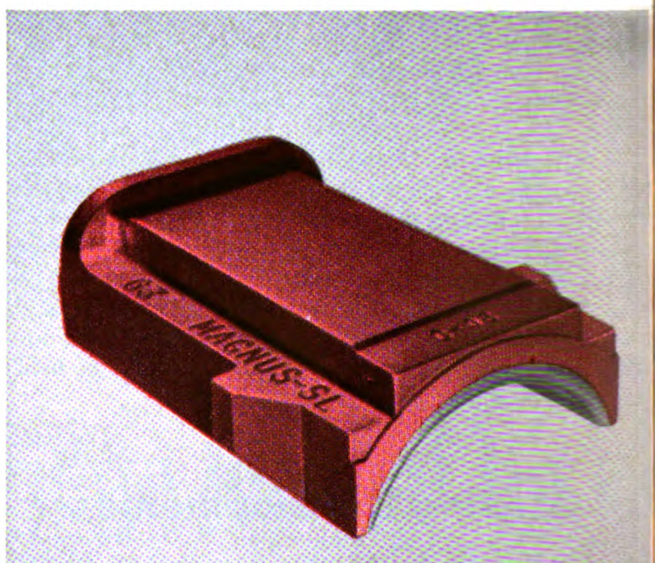


These Magnus Bearings can Stabilize Journals

Give you still longer car bearing life, may double bearing performance you're getting now.



FLAT-BACK BEARINGS
(AAR Alternate Standard)



NEW HI-HAT BEARINGS
(AAR Test-Approved)

Magnus Flat-Backs stay seated on the journals, eliminate excessive fore-and-aft movement under all normal operating conditions. That means full fluid oil film lubrication, maximum bearing performance all the time. Rear seals and bearings last longer. 2,000,000 car miles per hot box is a realistic goal for Flat-Backs.

Developed by AAR research, 10,000 carsets of Hi-Hat bearings are now authorized for interchange. They stabilize journals too. Wider wedge-journal box column contact area lets wedge take brunt of impact forces. And Hi-Hats are lighter—can save real money if current operating tests prove satisfactory.

For helpful, detailed information, write Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

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Journal Problems Have Top Priority in AAR Research

Center-plate testing machine shows lubricant and liner performance.

Improved performance, reduced servicing, and more rugged components for freight cars and locomotives are goals of mechanical research

"Of the many mechanical research projects under investigation this year, four are attainable goals in the future," W. M. Keller, vice president, AAR Research Department, told Railway Locomotives and Cars recently. "In order of importance, they are:

- Achieving 2,000,000 miles per hotbox set out;
- Expediting of train schedules by automatic brake inspection;
- Extension of AB valve cleaning time to five years or more;
- Extension of the journal-box repack interval to 36 months.

"As in past years, study of the journal-bearing problem will be given priority. The over 400% improvement in the hotbox set-out rate is helping in train operation, but the Research Center staff believes that much greater improvement can be accomplished."

Marked improvements continue to be made in freight-car hotbox performance. In 1960, there were 138,697 hotboxes reported. In 1961, this figure was 77,373, a reduction of 44.3%. In 1962 there were 32,809 setoffs, a reduction of 57% from the 1961 figure.

Certification testing of new and revised lubricator pads continues at the Laboratory. There are now 16 conditionally approved lubricators, the latest approval having been granted to the Atlas lubricator on February 1, 1963. Laboratory equipment is now available to make periodic quality checks of all test and conditionally approved lubricators, insuring against use of inferior materials so that the highest possible level of performance may be maintained. A journal-lubricator renovating machine is being used at the Research Center as part of a program to appraise the performance of renovated lubricators. One project is determination of the quantities of moisture which can be removed from lubricators which have been saturated with water.

Impact tests and studies of freight-car journal-bearing stability made in 1961 led to the Hi-Hat bearing and wedge design, a modification of the standard I-type steeple-back bearing (RL&C, June 1962, p 27). Test applications of 10,000 carsets have been authorized for interchange freight cars (RL&C, Oct. 1962, p 5). The Hi-Hat bearing has side contact faces which are vertical instead of being at an angle of 45 deg., serving to absorb impact forces on the wedge which is firmly interlocked with the bearing. By taking the impact force on the wedge, the possibility of pinching the bearing is practically eliminated. Untried bearing metals and plastics have also been under active consideration.

Studies continue on the journal bearing wedge to extend its wear life with the aim of insuring better load distribution on the bearing. Reports from two special task forces show many wedges to be in poor condition, a contributing factor in the hotbox problem. Wedge gauges, now approved, are more restrictive, which should serve to remove many unfit wedges from service.

Evaluation of additives in journal lubricating oils is being continued. Included are friction-reducing as well as

corrosion-inhibiting additives. Studies have been completed on all roller-bearing greases approved under AAR Specification M-917-56 for subsequent approval under M-917-60 with respect to structural stability, lubricating value of oils used, percentage and types of soap, and effect of corrosion on inhibitors. In the 1963 Interchange Rules, under Rule 66A (j), is a list of seven greases which conform to M-917-60.

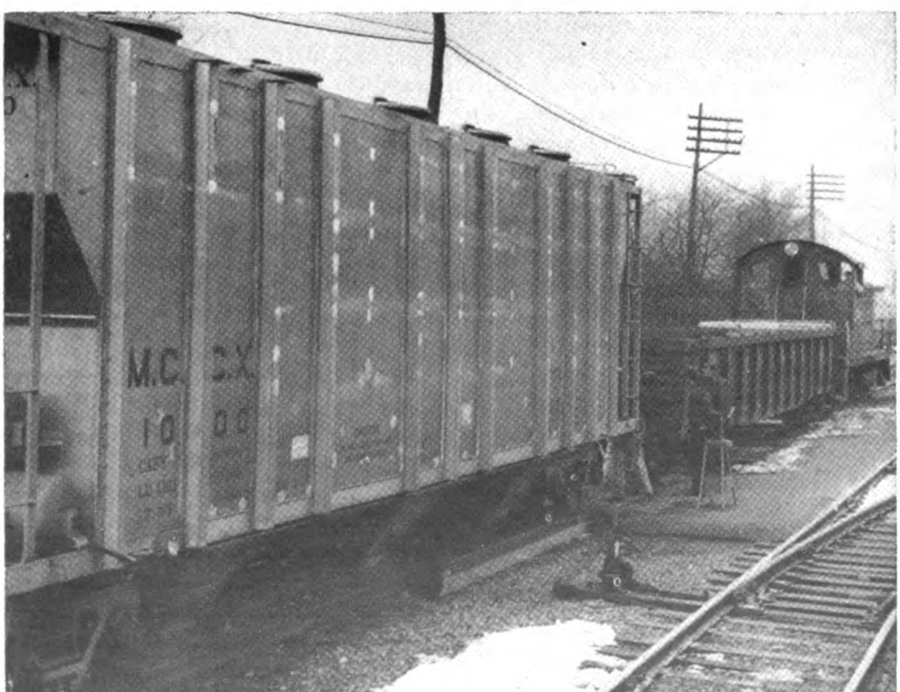
The center-plate friction machine has been in continuous service evaluating lubrication and liners. Several lubricants have been tested along with metal and plastic liners coated or impregnated with plastics, such as Teflon or nylon, which reduce friction. The most promising lubricant found so far is a heavy coating of soft, non-ferrous metals, such as lead or babbitt. A laminated-rubber center-plate insert being studied would eliminate metal-to-metal contact surfaces, with truck swiveling achieved by placing the rubber in shear. This unit would inherently tend to realign the trucks with the body after passing curves, thereby reducing low-speed rolling-resistance variables.

Brake Equipment

Service tests are continuing on the modified emergency portions of AB air-brake valves which have been equipped with rubber diaphragms instead of ring pistons. Service tests of the modified AB service portion (RL&C, June 1962, p 29) authorized on 7,500 interchange car installations are also continuing with these modifications, plus improved valve lubricants which are also under test. The AAR expects that AB valve-cleaning time can be extended from the present four years to five years or longer.

Tests of pilot models of a modified AB valve which includes the retainer valve are also being made. Additional design work and laboratory tests are required to determine the value of this modification. The Research Center has set up pressure-graph instruments to determine acceptability of brake-cylinder relief-valve designs. Certification tests, with the manufacturers paying the cost, are being made now that the specifications have been adopted. Performance tests of air-hose gaskets at low temperatures are continuing, with results on three different rubber compounds completed. Evaluation of several synthetics has started.

A study of automatic inspection devices is continuing. In addition to a sonic method for detecting defects in diesel engines, a project now under way aims to develop an automatic system for making brake inspections. First possibility is utilization of an isotope to indicate when brakes are applied and released. Preliminary designs of this system have already been prepared and one prototype has been laboratory tested. Further developments are anticipated. Field tests and evaluations of composition brake shoes are progressing in cooperation with a member road.



Aluminum covered hopper was subjected to impact tests at AAR Research Center in Chicago. In a program at Hollidaysburg, Pa., the characteristics of cushion underframes are being determined.

Cushioning Devices

AAR Research and the Pennsylvania, cooperating in tests at Hollidaysburg, Pa., are determining the characteristics of freight-car cushioning devices under two basic conditions:

- The level of lading-damage protection in a cushion-equipped car when it strikes a string of standing cars;
- The strength, under impacting squeeze, of the structural details of a cushioning device when the car so equipped is standing at the head of a string of cars and is struck by a fully loaded moving car equipped with standard draft gears.

The devices being tested include Barber Cushion Tube (with standard 24⅝-in. and alternate-standard 36-in. pocket draft gears); FreightMaster; Freight-Saver; Gliding Sill; Hydra-Buff; Hydracushion; Hydroframe-60; and Shock Control. Future tests are planned to evaluate other devices still under development.

Tests have also been made on cars equipped with standard pocket draft gears for comparison of lading damage protection and structural strength. Data from this entire program will assist in formulating standard impact testing procedures and specifications for official impact capacity and lading protection qualities. Impacting procedures are also being developed to be used for specifications covering the acceptability of cars of new design. Of particular concern are those new cars without through center sills and those constructed of materials in which plastic flow may be factor.

An overall program was recently completed involving evaluation of car compression capacity and ability to withstand impact and vibration. Tests made on an aluminum covered hopper built by Magor, included:

- Static compression of the empty car with Stresscoat applied to certain areas to determine points of possible high stress concentration;
- Static compression of the car when fully loaded with approximately 100 tons of coal during which strain-gauge measurements were made at 6 locations on the underframe and body.
- Impacts with the car fully loaded

ring which strain-gauge measurements were made at 38 locations on underframe and body.

During the compression tests, mechanical deflections were measured at ected side posts, side sheets, end or sheets, and end floor sheet stiffen-. Deflection of the carbody between sters was also determined. During pacts, the input force at the coupler l the closure of the draft gear were asured. The final report has been tributed to interested committees of Mechanical Division.

To strengthen box-car ends, eliming excessive bulging from lading ssure under heavy coupling im-cts, the Research Center has made tic bend tests and drop tests on -length sections of corrugated steel ls and of laminated wood-alumin sections. Load carried by the ninated sections was twice that card by the steel section before yield-, and the ultimate load over two es as high. During drop tests, the ninated wood-aluminum section abbed over twice as much energy.

During an investigation to compare supporting strength of laminated dwood in various thicknesses with egular 2⅜-in. tongue-and-groove e flooring, the steel Z-bar stringers re found to be the weakest point in floor (RL&C, Feb. 1963, p 12). e stringers failed before the timber ength was tested. The stringers bent tically and twisted laterally when load stressed the Z-bars beyond elastic limit.

Tests were run with I-beam string- of the same height to determine if y would effectively support the or under a heavier load. Results owed that the present 6.7-lb Z-section started to yield at 16,000 lb and led at 24,000 lb. When a 5.7-lb eam section was tested, yield started 22,000 lb and failure occurred at ,000 lb. The Committee on Freight l Passenger-Car Construction has ommended the 5.7-lb I-beam as a ostitute for the Z-bar. The I-beams ovide a 15% reduction in weight h an increase of 25% in floor ength using standard tongue-and-ove flooring.

le Research

Research on improved axle designs, ect of increased loading on axle life, d load ratings for diesel locomotive les of various designs are under continuous study. Stresses induced in the surface of the axle due to the press fit of wheels and gears are of particular concern. A report, to be available shortly, will recommend modification of axle designs to reduce these stresses. Such stress is an important factor in the low fatigue life of axles on freight cars and diesel locomotives.

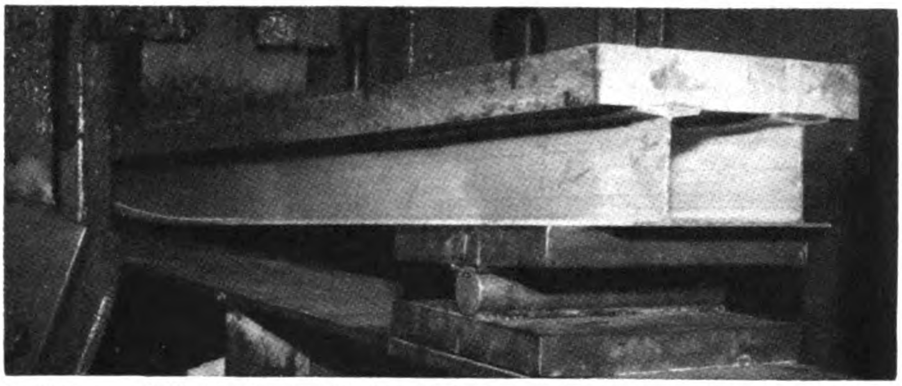
The effect of fatigue on freight-car axles carrying loads higher than present ratings has been investigated along with new axle designs for loads 10 and 20% higher than present ratings.

The effect of surface finish on friction coefficient of steel journals under babbitt bearings is being studied. Probably the importance of turning an axle journal to a smooth finish before rolling or burnishing to the final finish will be shown.

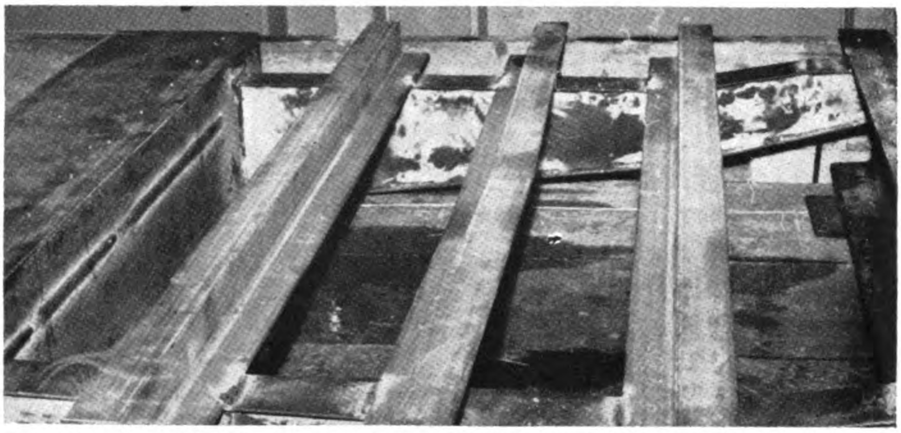
The study of automatic car identifiication (ACI) systems is being accelerated and related computer projects are being considered. Some member roads have provided the Research Center with estimates of savings resulting from use of ACI systems. All heat-leakage tests made by refrigerator car companies have been summarized by the Laboratory. Standard test procedures will be established for determining the effect of insulation and car construction on heat loss.

Freight-car trucks with 38-in. wheels to reduce the rail loads have been designed. This is a joint study with the Truck Manufacturers' Engineering Committee and the AAR Committee on Freight and Passenger Car Construction. The design has been turned over to the truck manufacturers for development of practical side-frame castings and bolsters.

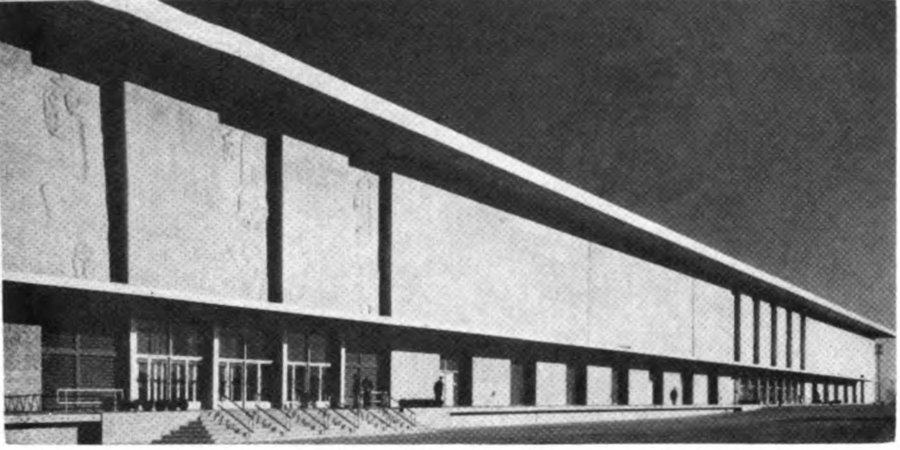
Sonic methods for detecting defective moving components in diesel engines and cars—a joint project with Stanford Research Institute—are continuing under study. These are expected initially to provide a system which can quickly indicate defects in diesel engines. If a satisfactory system is developed, a survey of other locomotive and car parts will determine other possible areas of use. Cooperating with the Engineering Research Division of the Research Center, the Mechanical Research Division has studied the operation of long piggy-back cars on sharp curves. Methods to improve tracking of long cars on curves are still being developed.



Composite wood-aluminum box-car end was subjected to drop-hammer tests. It was found to absorb over twice the energy of a corrugated steel end before yielding and failing.



Zee sections in simulated box-car floor-support construction were found to buckle laterally under much smaller load than I-beams. This was found in course of testing flooring.



McCormick Place, Chicago, will be site of indoor exhibits during the American Railway Progress Exposition. A total of 268 exhibitors have already taken space here and at track (p 6).

Exposition, Meetings Set for Mid-October

The American Railway Progress Exposition and meetings of practically all the railroad industry's organizations, including the AAR Mechanical Division and the Coordinated Associations, have been scheduled for October 9 to 16. A preliminary program, just issued, indicates that planning is well advanced. Unless otherwise shown, the meeting-room assignments are in McCormick Place, one of two exhibit areas. Outdoor site will be Illinois Central's nearby 31st Street Yard where 6,300 ft of the 7,000-ft available has already been sold to track exhibitors of car, locomotive and track maintenance equipment.

Wednesday, October 9

All day. Formal opening of Exposition followed by opening of indoor and outdoor exhibits; AAR Mechanical Division committee meetings (Morrison Hotel and AAR Chicago office); American Railway Engineering Association membership meeting (Banquet Room); AAR Communication and Signal Section annual meeting (Chicago Room); Station Operating Officers and Motor Transportation Officers of AAR member roads (Room 11).

Morning. AAR Purchases and Stores Division annual meeting (Little Theater); Railway Progress Institute annual meeting.

Afternoon. AAR Board of Directors meeting (Sheraton-Blackstone Hotel).

Evening. Railway Progress Institute annual dinner (Conrad Hilton Hotel).

Thursday, October 10

Morning. AAR member-road meeting (Little Theater); AAR Communication and Signal Section annual meeting (Chicago Room); AAR Purchases and Stores Division (Lakeside Room); AREA committee meetings.

Noon. Joint Railroad and Suppliers luncheon.

Afternoon. Joint session of all groups and invited guests (Arie Crown Theater).

Evening. AAR Purchases and Stores Division dinner and entertainment (Morrison Hotel); AAR Communication and Signal Section banquet (Sheraton-Chicago Hotel).

Friday, October 11

All day. AAR Mechanical Division membership meeting (Lakeside Room); Station Operating Officers and Motor Transportation Officers membership meeting (Room 11).

Morning. AAR Communication and Signal Section annual meeting (Chicago Room); AAR Purchases and Stores Division (Little Theater).

Saturday October 12

All day. Outdoor exhibits open to general public. Indoor exhibits will be closed.

Sunday, October 13

All day. Outdoor exhibits open to general public.

Afternoon. Indoor exhibits open to railroaders and to selected public by invitation.

Monday October 14

All day. Air Brake Association annual meeting (Room 10); Car Department Officers Association annual meeting (Room 12); Locomotive Maintenance Officers Association annual meeting (Banquet Room); Railway Fuel and Operating Officers Association annual meeting (Room 11); National Association of Shippers Advisory Boards committee meetings.

Morning. Joint session (10:[illegible] a.m.) of the Coordinated Associations (ABA, CDOA, LMOA, and RF&OOA); the Roadmasters and the American Railway Bridge & Building Association (Arie Crown Theater).

Afternoon. Roadmasters and Maintenance of Way Association annual meeting (Chicago Room); American Railway B&B Association annual meeting (Lakeside Room).

Evening. Railway Supply Association dinner and entertainment (Morrison Hotel).

Tuesday October 15

All day. National Association of Shippers Advisory Boards annual meeting (Morrison Hotel).

Morning. Air Brake Association annual meeting (Room 10); Car Department Officers Association annual meeting (Room 12); Locomotive Maintenance Officers Association annual meeting (Banquet Room); Railway Fuel and Operating Officers Association annual meeting (Room 11); Roadmasters and Maintenance of Way Association annual meeting (Chicago Room); American Railway Bridge & Building Association annual meeting (Lakeside Room).

Noon. Coordinated Associations Luncheon (Banquet Room).

Afternoon. Visits to exhibits.

Wednesday October 16

Morning. Air Brake Association annual meeting (Room 10); Car Department Officers Association annual meeting (Room 12); Locomotive Maintenance Officers Association annual meeting (Banquet Room); Railway Fuel and Operating Officers Association annual meeting (Room 11); Roadmasters and Maintenance of Way Association annual meeting (Chicago Room); American Railway Bridge & Building Association annual meeting (Lakeside Room); National Association of Shippers Advisory Boards annual meeting, general session (Morrison Hotel).

ıutomating Conventional Trains

ıutomation of freight trains made of conventional interchange cars ɔmpletely practicable and can re- in improved overall performance. › Westinghouse Air Brake engi- ·s explained to last month's Joint E-ASME Railroad Conference in ınta, Ga., that "freight automation rs a high degree of safety as well mproved overall performance."

'. M. Hines, engineering manager, J. R. Pier, manager, mass transit neering, also discussed the auto- ion of rapid-transit operations ..&C, Nov. 1960, p 23) and of the ive ore-hauling operation of the ı Ore Co. of Canada in Labrador ..&C, Oct. 1962, p 17). They ex- ned that the IOC automation in- 'ed installation of a simple electro- umatic brake on each of the cars ıeet the narrow spotting tolerances ıired.

'he Wabco engineers then went on ›oint out that a mining railroad in western U.S. handling conventional rchange equipment has also been ɔmated. This railroad extends ap- ximately 75 miles, including 12 ›s of 2% grade in addition to many ves and grade crossings. Train- dling problems in such territory difficult to solve manually or auto- ically.

'eventy-five loaded ore cars are ved the 75 miles from an agglomer- g plant to a railroad connecting ıt, and the return trip is made with milar train of empties. Interchange ; are used, so no special car equip- ıt is possible. No power is available wayside, making an inert signaling ;em mandatory. In order to main- ı production schedules, running e must average 3 hr in each di- tion.

Γo meet these requirements, an in- nittent wayside control system was ;cted, utilizing passive track ele- nts and active locomotive-carried sing units. To meet the relatively ›rt schedule times, five speed zones re designated—15, 20, 25, 30 and mph. Roughly 12 miles of the wn-hill run is 15- and 20-mph zone; miles, 25- and 30-mph zone; and remainder, 40-mph zone, In addi- n to indicating speed zones, the way- e system also provides intelligence ıcerning level and downgrade conditions and operates the horn and bell on the locomotive.

The locomotive-carried equipment consists of three basic systems—the communications system which receives intelligence from the wayside and transmits to other control units in the locomotive; the throttle control system, and the brake control system. The locomotive senses its own speed by means of an axle-mounted pulse generator, and the various control systems then take the proper action to maintain the speed indicated by the wayside zone. On level terrain—less then 0.5% downgrade—speed is controlled by automatic throttle manipulation and minimum-service brake applications. For downgrade operation, which makes up the major portion of the loaded trip, a more precise control is required. To achieve such control, a special grade braking control unit is called into play. This unit is capable of sensing speed changes as small as 0.1 mph over a 2-sec interval. The speed variation information is utilized through logic circuitry to manipulate dynamic brake, air brake, and throttle for safe, smooth control. A total speed variation of plus or minus 1½ mph can be realized with this type of control. As an added measure of safety, the grade control unit has its own speed sensing system.

Fail-Safe Design

While the normal control elements are of non-vital, open-circuit design for simplicity and reliability, the entire system is protected by a vital closed-circuit emergency network which can be tripped by overspeed, power failure, loss of communication, or other vital failures.

To check the brake system, a special sub-system was incorporated in the automated brake equipment to monitor brake-pipe integrity each time the control transfers from manual to automatic. Achieving this without radio or electrical communication to the last car required the development of a portable pneumatic unit, the Brake Pipe Integrity Checker, which is hung on the last car and connected to the brake-pipe hose. Each time a change to automated operation is initiated, an emergency application occurs. This application triggers the Brake Pipe Integrity Checker which then senses the recharge of the brake system as the emergency is released. As brake-pipe pressure increases to a level about 15 psi below the full-charge value, the Brake Pipe Integrity Checker initiates a service brake application from the rear end of the train. When this application reaches the locomotive, it serves as evidence that the brake pipe is continuous, and automatic operation proceeds as soon as the brakes are released.

By means of automation, it has now become possible to move heavy tonnage trains down precarious grades with no skilled manpower but with maximum safety and reliability. While remote control of freight operations does not strictly fall within the category of train automation, much of the equipment is similar, the major difference being that decision making is left to the operator, simplifying the control problem.

From the standpoint of over-the-road operations, the most significant remote control contribution has been in the Remote Multiple Unit Control System. In this, motive power is distributed at several locations in the train rather than being concentrated at the front end. Throttle and braking manipulation is performed by the engineman on the lead locomotive in a normal fashion, but the remote mutiple unit equipment transmits information representing these operations to the units spaced back in the train via radio so that operations performed on the lead unit are duplicated on all remote units. Digital coding is used to overcome possible faulty operation due to interference and, in the event of signal failure due to blind spots or malfunction, the remote units are programmed to "isolate" themselves and become just another car in the train until the signal is restored.

Remotely controlled multiple unit systems of this type have been tested on several railroads. In every case, it is possible to run longer trains at higher speeds with little or no slack action. The distribution of motive power reduces the danger of drawbar failures, and the distribution of brake control makes possible much faster applications and releases. With proper

spacing of the remote units, freight-train control can approach that which was once possible only with passenger equipment.

Where distribution of tractive effort is not required but improved brake performance is desired, a Repeater Relay Equipment unit is available. This fully pneumatic device can be installed in an ordinary box car, midway in the train, connected to the brake pipe of the existing brake system. An engine-driven air compressor mounted in the same car provides an air source. The Repeater Relay then repeats to the rear section of the train all brake operations sensed from the brake pipe of the front section, providing in effect another brake valve
the train. Brake cha
plication and release t
pipe gradients are all i
ably by such an ins
these improvements a
dramatic as those ac
mote multiple unit op
frequency allocation i

New Problems in Car Interchange

This is the twenty-eighth installment of a series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs To, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirements of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the Rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, come from a background of intimate association with the application of the rules. The twenty-seventh installment appeared in the August 1961 issue, p 38.

When a loaded car is received in interchange with defects which cannot be corrected either by permanent or temporary repairs and there is joint agreement between the receiving and delivering roads that the lading should be transferred into another car, which road assumes the cost of transfer? (298)

The delivering road.

In cases where the rules require the delivering road to pay the receiving road for the cost of transferring lading from a defective car which is delivered in interchange, which road must assume the incidental costs involved, such as switching the defective car to the transfer track, selecting and switching another suitable car to the same location to carry the load, the extra per diem charges while both cars are held for load transfer, and the extra handling to get the defective car moving to owner's shops for permanent repair? (299)

The receiving road.

Where a receiving road expects to be paid by the delivering road for the bare cost of transferring the lading from a defective car delivered in interchange, as authorized by the rules, is the receiving road now the sole judge as to whether such load transfer is necessary? (300)

No. The present rule requires that the delivering road must be in agreement with the decision of the receiving road before it is obliged to issue a transfer authority.

Why was the transfer rule (Rule 2) changed from its previous form which stipulated that the receiving road was to be the sole judge in all such cases? (301)

Because of evidence indicating that that some receiving points were sometimes taking undue advantage of this provision, either through the exercise of highly technical decisions as to transfer of lading or through refusal to make temporary repairs to avoid transfer where it was possible and consistent to do so.

Under the present provisions of Rule 2, are all defective cars from which lading has been transferred actually reaching a home shop of the car owner for permanent repairs? (302)

The information which has been obtained thus far indicates a remarkable improvement in this respect. In general, there are now only a few scattered cases where something goes wrong and, as time goes on, it is expected that these can be practically eliminated. Under the old rules it sometimes happened that ladings were transferred from a given car several times for the same defect. It is important that all concerned continue
all of their obligatio
new rules so that the
ation can be avoided.

What do the records in
the age of the defects
cars from which lading
transferred while en ro

The records indicate th
vast majority of cases, the
were in existence when the ca
loaded.

What can be done to avoid
loading of cars with defects w
might result in the transfer
lading while en route (304)

By strict observance of the se
paragraph of Section (a) of Ru

What are some of the most c
mon defects in freight cars w
necessitate the transfer of th
contents en route? (305)

Broken cover plates and other
tions of body bolsters, broken
sills, door posts broken away f
side sills and forced outward, br
draft and center sills, and floors

Since far more loaded cars mo
through interchange among ro
in the Chicago district than at
other large railroad terminal in
country, is it also true that mo
loads are transferred at Chica
because of defective car conditi
than at any other point? (306

No. The roads at Chicago
found ways and means of co
ling this situation.

How many defective conditions
now outlined in the rules for wh
load transfer will not be issue
(307)

The list was recently increas
10 items.

Maintain high engine availability with Texaco diesel fuels, available nationwide

When you specify Texaco, you can count on getting the diesel fuel you need. That's because Texaco has over 100 tank car loading plants strategically located across the nation. And every plant carries a complete line of Texaco Diesel Fuels, for all sizes, types and makes of diesel engines—in locomotives, maintenance-of-way or highway equipment.

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CHICAGO & NORTH WESTERN RAILWAY WILL CONVERT 870 FREIGHT CARS TO TIMKEN® "AP" BEARINGS

BIGGEST CHANGEOVER IN RAILROAD HISTORY

Chicago, Ill.—Beginning in April, 870 box cars owned by the Chicago and North Western Railway Company will undergo overhauling at the company's Clinton, Iowa shops—as part of C&NW's plans to modernize more than 5,600 freight cars in 1963 for better service to shippers.

The 870 box cars will incorporate the latest developments in railroad modernization, including conversion to Timken® "AP" roller bearings.

The changeover, which adds new economies and faster service to Chicago and North Western's present freight car fleet, is considered the largest ever undertaken by any railroad or bearing company.

Timken "AP" bearings are solving the hot box problem—No. 1 cause of freight train delays. They are currently in use or on order for over 109,000 freight cars across the country. They are averaging over 100,000,000 car-miles between setouts due to overheated bearings.

Conversion to Timken bearings can be completed in a matter of a few man-hours of labor and at a cost offset by resulting economies in inspection and maintenance. C&NW's Clinton shop expects to convert six cars per day.

For further information on freight car modernization with Timken "AP" bearings, write The Timken Roller Bearing Company, Canton 6, Ohio. Also manufacturers of fine alloy steel and removable rock bits.

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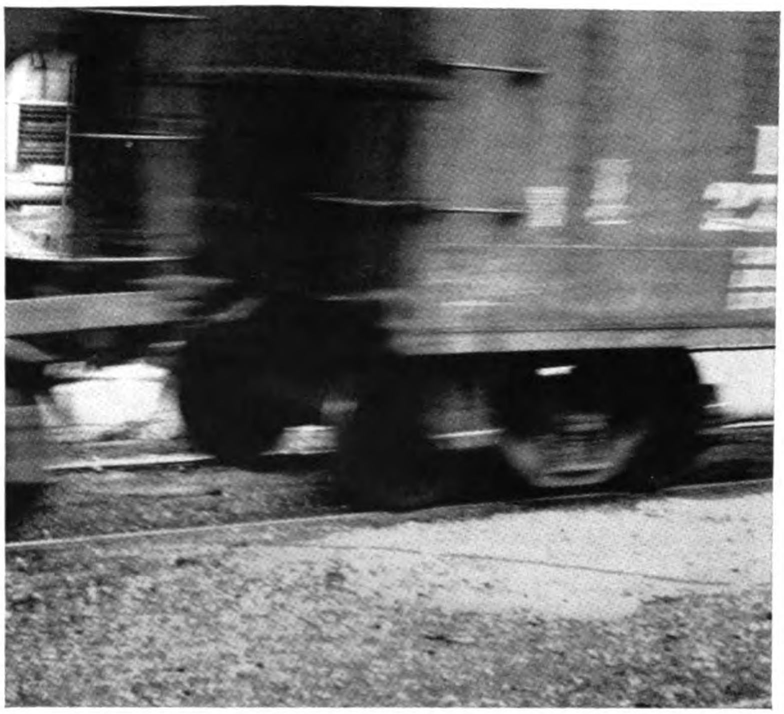

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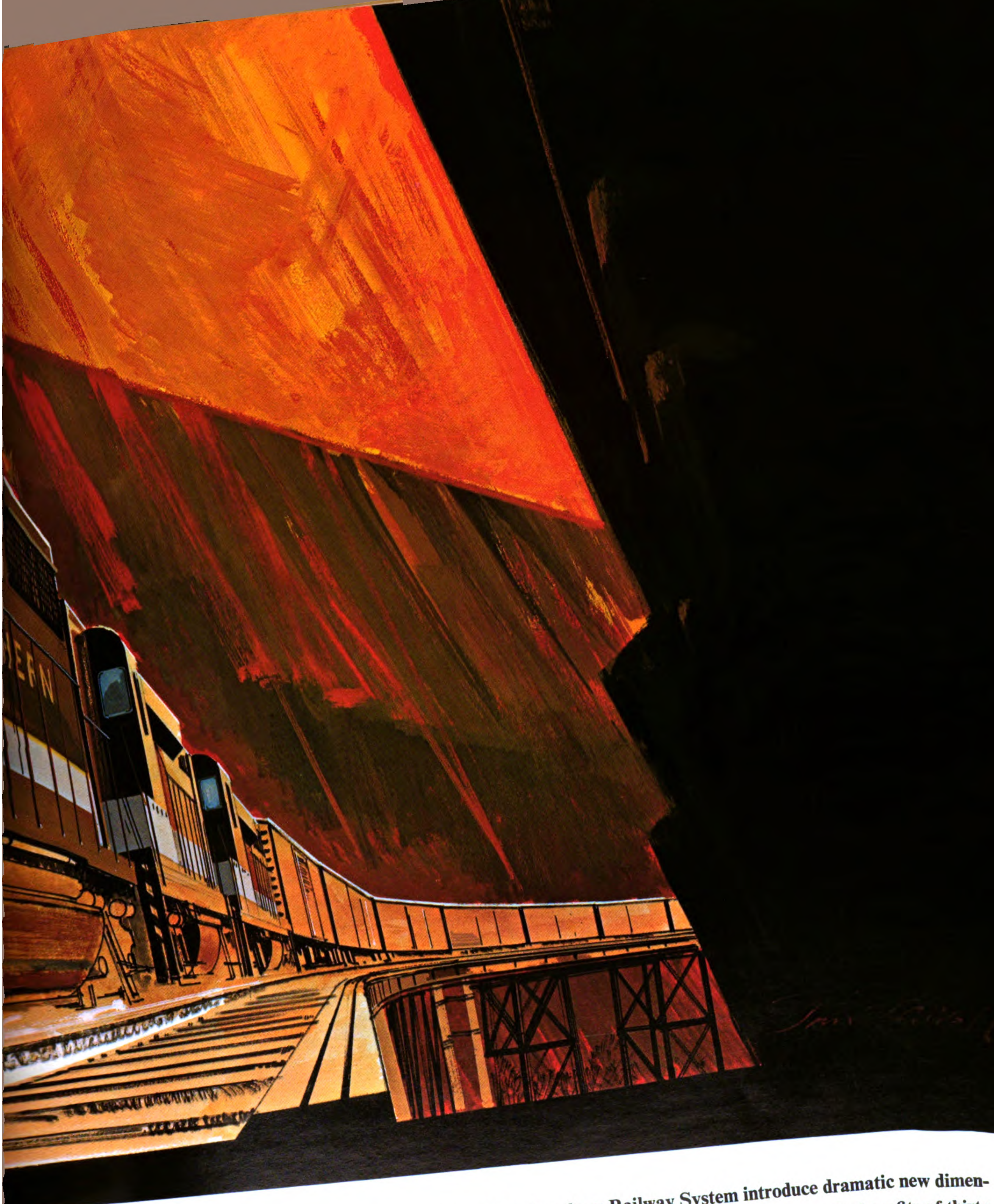
Before placing your next order for wheels, check the dates on a few Armco Wrought Steel Wheels still in service. Don't be surprised to find many freight car wheels that are 15 to 20 years old . . . some even older, proving they hold up as service conditions become more severe. Only wrought steel wheels have been proved in heavy diesel and fast passenger car service. You can be sure they will stand up in the tougher freight service of the future.

Why gamble with unproved wheels when you can have Armco Wrought Steel Wheels—with their unsurpassed record for reliability. For complete information, call your nearby Armco Sales Office or write **Armco Division, Armco Steel Corporation, Dept. A-1273, P. O. Box 600, Middletown, Ohio.**

ARMCO Armco Division

On the Southern Railway . . . the Revolutionary GP-30



Today's Mechanical Department

J. H. Heron, assistant vice president—equipment, New York Central, told the New England Railroad Club on April 9, 1963, how new conditions, techniques and procedures change Mechanical Department operations. He discussed up-to-date locomotive, car, systems and controls, and engineering functions of the department and why new ideas are essential to the railroads' survival in today's transportation competition.

This is an age of change. Twenty years ago diesel locomotives and air-conditioned cars were an innovation. Ten years passed before the number of diesels exceeded the number of steam locomotives in service. However, in the next five years the changeover to diesels was substantially completed.

The rate of change for railroading has accelerated again in the past five years. Federally financed highways, waterways and airways have continued to contribute to this in great measure. Subsidized competition has subjected the railroads to the increasing pressure of a profit squeeze.

Our first reaction to this pressure was to employ the tools of professional management. We used methods improvement, time study, and cost control over labor and materials. We went into the battle on a defensive basis to hold our position. Over the past five years of siege we have lost some ground. Today we are lean, hungry and perhaps a little angry. Today we are in the mood to counterattack.

Today there is no need and not much place for some factors that made up yesterday's Mechanical Department. Although cars and locomotives are more complicated, their repair and operation can be supervised and administered by a few men, trained probably by the vendors. Standardized parts are usually available off the shelf, drastically scaling down the need for specialized facilities and design.

I am not advocating the partial elimination of the Mechanical Department or the abolishment of any of its functions. Instead, I am urging that we change with the railroad world around us. We must foster, accept and use such terms as economical life, cost controls, customer equipment acceptance, market analysis, and machine mechanization. This is not what we should do, but what we must do to enable our industry to survive. We must be equipment oriented, not just repair oriented.

The organization charts of various Mechanical Departments may vary but, in general, the functions will probably be distributed to four major categories: namely, locomotives, cars, systems and controls, and engineering. Other functions, such as air brake, personnel, and safety, may or may not be included as a subdivision of the major categories.

I'd like to discuss assignments of each major category of the Mechanical Department in general, as we believe a modern equipment management should function.

Locomotive Department Function

We know the importance of a well-maintained serviceable locomotive but, of equal importance to the success of your company, is that you know:

- You have an adequate number of locomotives but not too many.
- The economic life of your present fleet.
- The obsolescence factor and the impact upon your operation.
- Availability and utilization of the fleet.
- The trend line of your average annual maintenance costs.
- The financial effects of an adequate replacement plan.

We have always had reams of figures and statistics with reference to maintenance costs, fuel, lubrication and manpower, but it is doubtful if many Mechanical Departments have felt the need to justify the number of motive power units. Too many units per train, or too many in service means extra maintenance dollars. Poor servicing facilities, or improperly located facilities cost locomotive time and ultimately result in the need for more units. More units than necessary, even though stored, cost the railroad equipment accounts money in the form of depreciation. Too few units mean drag tonnage and, in today's market, you can't be competitive and drag high revenue freight.

The economic life of the fleet is generally acknowledged to occur when the total cost of locomotive maintenance, including the amortization of the investment, reaches its lowest yearly cost and where additional or fewer years of service will result in increasing the annual operating cost.

In respect to obsolescence, economic changes, changes in physical requirements, improvements in equipment and other factors may well indicate replacement of locomotives before their economic life, yet these factors will not affect the determination of the economic life as defined heretofore. It is in this category that you must, in conjunction with the Transportation Department, decide what extra power per unit may mean to your railroad.

The availability and utilization of the fleet needs no particular explanation other than it offers a measure of the performance of terminal mechanical people and transportation people.

The trend line of your average annual maintenance costs will reflect poor maintenance procedures, such as your inability to shop locomotives at the optimum time.

The financial effects of an adequate replacement plan must reflect the maintenance savings; the scrap salvage; the sales salvage; the fuel savings; the crews' wages savings; the rental, if any; the interest on the payments and increased depreciation. The interest on the payments and increased depreciation can be supplied by your respective Accounting Departments, and the impact on cash and assets can be forecast in advance for a 10-yr period or any other period selected. Armed

h this information, you are then in a ition to justify your request for new ver.

r Department Function

There are 1¾ million freight cars use on the North American Conti- it, and your railroad probably has multi-million-dollar investment in t of this fleet.

Heavy repair and rebuilding pro- ms have, at times, been conducted some railroads on the whim or gment of the officer in charge of the chanical Department. We believe officer in charge of the Mechanical partment should have costs avail- e as adequate tools upon which to ommend programs for further de- mination in budget expenditures.

Basic historical data, evaluation of deferred maintenance in the car t, and true costs reflecting true erheads are the first three requisites. these basic figures we must add the nomic life and obsolescence figures the units. However, our formula w becomes considerably more in- lved than with locomotive repair sts, because we must also evaluate customer's acceptance, and this aluation can probably best be ob- ned from our market research.

The company's money is wasted by pairing cars for lading that is un- ofitable to haul, or by repairing cars r which there are no particular cus- mer requirements.

Today's high cost of equipment, in- rporating refinements such as cush- n underframes, roller bearings, and ecially equipped cars, dictates that ese factors all be carefully weighed d evaluated before purchasing or building programs are undertaken.

ystems and Controls

To the Systems and Controls Divi- on, which we advocate as a part of our respective Mechanical and quipment Departments, we would locate the responsibility of motivat- g and cooperating with the Market- g Group.

Today we find that the counter-at- ck on the profit squeeze will be led y marketing personnel. Their plan is create competition; not merely to eet it. The order of the day is to ake rapid advances in the develop- ent and introduction of new, custom- esigned, high-capacity freight cars. verall marketing tactics are to pro- vide lower rates afforded by reduced costs, to reduce transit damage, to eliminate dunnage and load secure- ment costs, to simplify loading and un- loading of freight cars and to reduce bad-order delays.

This country's present fleet of freight cars is technologically obsolete. It does not measure up to the job that can, and must, be done. This includes some of the recently introduced car designs which are costly to operate, costly to maintain, and which damage some products during unloading. These problems will be overcome by new car designs.

Facts of this nature have led us to reappraisals of the Equipment Depart- ment function, organization and fa- cilities. If the equipment that we deal with is changing so rapidly, we must likewise change. Our job is especially challenging at this time, since railroad profits are at a low ebb. Equipment financing can be attracted by good propositions but at high interest rates. We cannot afford expensive mistakes.

Our major organization change, to date, has been the establishment of a new function in the Equipment De- partment. Our Director of Systems and Controls is charged with responsibili- ties to coordinate joint action of the equipment and marketing groups on special equipment studies and to act as the motivating force to advance the equipment planning function. Further, he has staff responsibility for develop- ing and installing improved processes, operating practices, systems, and per- formance controls for the designing, building, servicing, repairing and re- tiring of our rolling stock. In further- ance of these duties, he is responsible for cost study and capital expenditure project development and evaluation.

We recognize a number of immedi- ate questions to be resolved. What types of freight cars must be replaced first? How much time do we have? What are the specific needs of the cus- tomers that our car designs must satis- fy? Can any of our present cars be modified to meet these needs? What type and number of cars should be re- tired to provide capital to help finance these changes? What new servicing and repair problems do we face? Do we have the right type of facilities in the right place to meet these new de- mands?

Previous reference to accelerated change cited dieselization as an ex- ample. This program primarily af- fected internal affairs of the railroad. The present program on freight cars, likewise, concerns and affects the in- ternal affairs of the railroad. How- ever, to a greater extent it concerns and affects hundreds of thousands of present and potential customers for railroad service. To win our battle over the competitive profit squeeze, to regain a strong and vigorous place in the transportation economy, we are facing our challenges. By organizing for change and by deliberately plan- ning and initiating carefully controlled change, our Equipment Department is launched on a program of aggressive action to carry out the marketing di- rected attack.

I urge that each railroad explore this concept and take the action in- dicated. We look forward to your joining with us in this new field since the sum of the actions of each of us will play a major part in reenergizing the railroad industry.

Equipment Engineering

Today's engineering may well re- quire fewer engineers and draftsmen than formerly. This is brought about by the fact that our suppliers in the locomotive and car industries have greatly augmented their research de- partments and have shown a willing- ness to explore new ideas and innova- tions at the request of the various rail- roads. However, our engineers must use profit-oriented thinking. If an en- gineer can save the customer $100 for blocking and dunnage per car without affecting the revenue earned per car he would, in effect, reduce the freight rate per car without affecting the rev- enue per car. He must be especially alert to new techniques and develop- ments in the equipment field and he must, above all, cooperate with mar- keting and research in order to maxi- mize the profit of his company. So much for organization.

Motive Power Control

One of the newer activities of the Mechanical Department is computer scheduled locomotive maintenance and distribution now being program- med on machines by the New York Central which will be in operation by early Spring of 1964.

The distribution of locomotives will be, we hope, automatic, based on necessary horsepower for speed of a particular symbol train, the tonnage,

the terrain, etc. The computer w know the m-u limitations of the loco motives, which ones must lead, wh ones must go to their respective te minals for shopping, which ones cheaper to run, which are least lik to fail, and the requirements for m tive power in the reverse directly early as possible. The machine w select a preferred consist with altern consists, if any are available.

The machine will be fed the arr and departure times continually by main points on the System. Requ ments for other than standard sym trains will be requested by outs points as far in advance as poss and processed immediately.

Eventually, automatic identifica read-outs will report locomotives the machine bureau and advise as whether they are shut down or not.

The computer will schedule locom tives to the shop on the basis of us and failure of component parts.

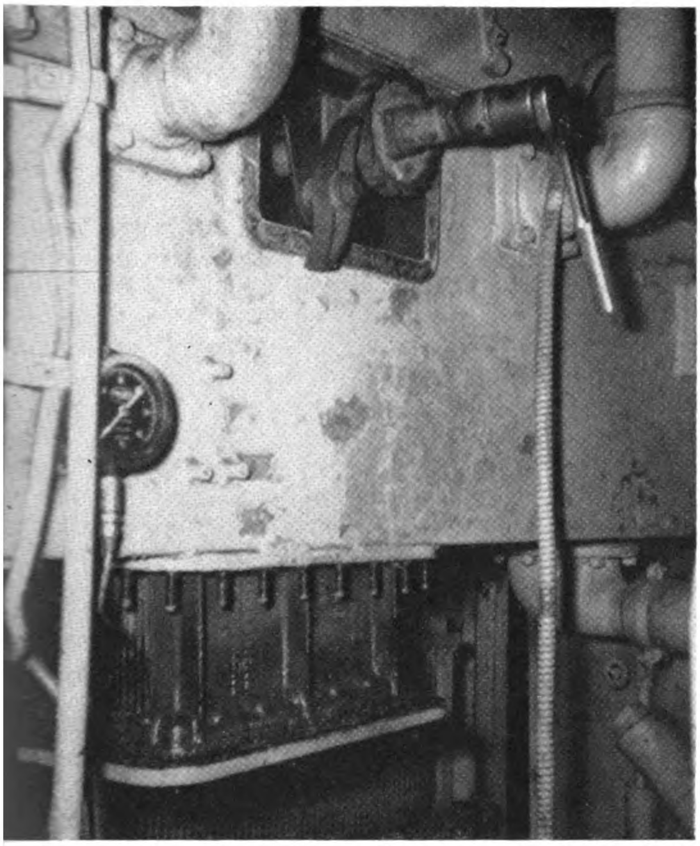
We will get daily output messag and, so as to conserve the reading an digesting of a lot of paper, where po sible, the reports will be of the exce tion type.

Some of the output messages ar units assigned to train; power supp by terminals; units out of service; un en route dead in train; terminal utili tion of power; unit availability; u repeat failure; units due inspectio unit scheduled maintenance ite printed federal card; units sched for shop; monthly failure repo quarterly diesel unit component re port; daily report—freight-train pe formance; power shortage repo units not moved in last 36 hr; edit real time data; edit of daily batch da units exceed quota; consist chang power dispatched light; trains held f power; monthly report—freight-tra performance and when to store uni

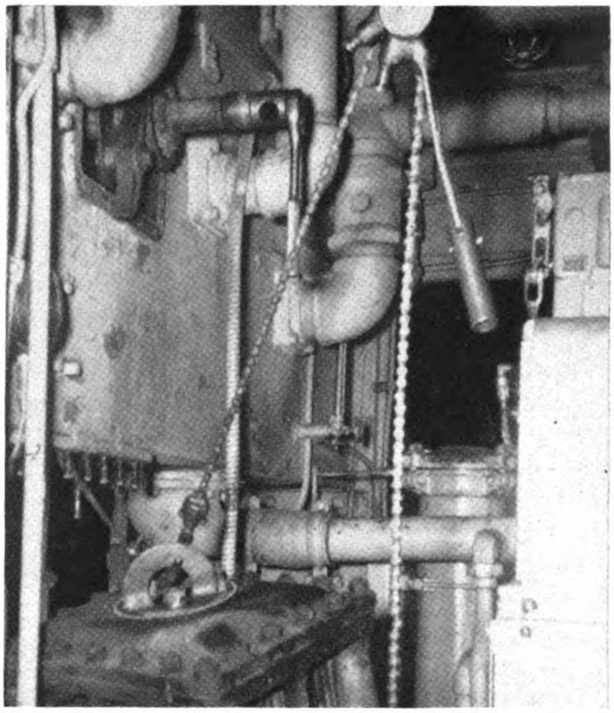
I have only highlighted our conce of an organization to cope with toda problems and some of our newer pr cedures.

Mechanical Department person must be salesmen and we m work in close harmony with all dep ments of the railroad and with our s pliers and prospective customers.

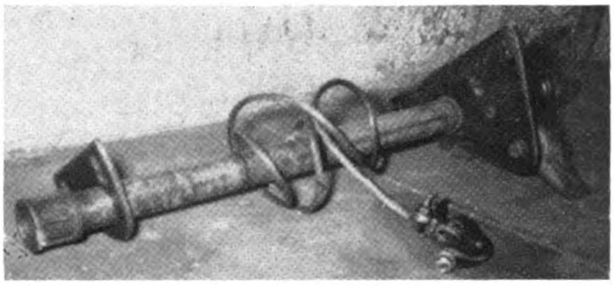
There are, I understand, some billion dollars spent in the Uni States each year for transportation goods and people. If your railro isn't getting its share, then, in so measure, it is an indictment of y ability.



indlass assembly is slid through the cooling water tank and supported by o of the bolts which are used for applying the handhole covers.



Cooler is transferred from windlass to chain hoist during removal.



Windlass is designed to fit the varying widths of water tanks.

Vindlass Simplifies Oil Cooler Removal

.emoval of oil coolers from the Genral Motors switching locomotives of ne railroad has been simplified by a pecial handling device developed at ie road's main shop. Not only has the nit speeded the operation, it has also iade it a one-man job.

Locomotives involved are Electro-Motive NW-2 and SW-1 units, 1,000 nd 600 hp, respectively. The oil cool-r on these units is located within the ooling water tank high in the hood, ust back of the radiator. It is removed y dropping it from the tank where the asketed base of the cooler is held in lace by a series of studs in the tank ottom. Prior to development of the andling device, the restricted space round the water tank made it diffi-ult to hold the cooler up while the uts were removed from these studs.

The device is installed through in-spection covers on the front and rear of the water tank. Basically, it is a hand-operated windlass which can be attached to the cooler core to lower it from its installed position.

The windlass consists of a pair of triangular shaped ¼-in. plates installed over the ends of a 29½-in. length of 1¼-in. pipe which serves as the drum around which the 6 ft of ¼-in. wire rope is wound. The end plates have keyhole slots which make it possible to slide them over pairs of the handhole cover bolts on the front and rear of the water tank. One of the plates can be moved along the pipe to make it possible to use the same device in the tanks of different widths which are used on the SW-1 and NW-2 units. One end of the pipe is fitted with a freight-car hand-brake ratchet and pawl and with a shaft extension having a ½-in. drive socket. The opposite end of the pipe has a coupling which keeps the adjustable end plate from coming off.

In use, a clamp at the end of the cable is attached to one of the studs in the top of the cooler. Then the end of the windlass with the adjustable end plate is shoved through the rear handhole cover, over the top of the cooler, and out through the opposite handhole. The windlass is then hung in place with four of the handhole cover bolts, producing a substantial mounting for the device.

The windlass is then drawn up and locked with the ratchet while the nuts on the studs are removed. When this is completed, the cooler can be lowered out of the tank. A light chain hoist is then used for moving the cooler out of the switcher's hood. The process is reversed when installing a reconditioned cooler.

On the NW-2 locomotives, particularly, there is a minimum of working space between the water tank and the end of the engine. Even here it is possible to use a 10-in. ratchet to raise and lower the lubricating oil cooler with no difficulty.

CN Spring Reclamation Yields Savings

Freight-car spring reclamation on the Canadian National has been developed and refined until it now has yielded an in-pocket saving of $275,000. The heat-treating process which is used evolved in the course of comparing springs supplied by different manufacturers.

Several years ago the CN Research Laboratories in Montreal ran comparison tests on Type D freight-car truck springs—8¼ in. free height and $1\frac{11}{16}$ in. travel—to evaluate those obtained from various manufacturers. This comparison was made before the current method of shot peening railway springs was developed; consequently none of the springs tested had been surface treated.

As part of the CN comparison, springs were endurance tested by compressing them one inch from a height established by a predetermined load at a rate of 250 cycles per min. It was noted that several springs had endurance limits of over one million cycles —roughly 2½ times the endurance of the majority of the springs.

The machine used for the endurance tests was originally designed and used for endurance testing of brake beams with its motion produced by a 1-in. vertical movement of the upper platen. The lower platen is adjustable in height, permitting any desired initial deflection or initial load to be applied to the spring. The initial load applied on Type D springs produces a deflection of approximately $\frac{1}{32}$ in.

A metallurgical investigation was undertaken to explain the unusual endurance and to find a means of reproducing this characteristic. Studies of the microstructure, surface condition, composition, and cleanliness of the steel yielded no clues. Residual stresses remained as a factor that might be responsible for the high endurance limit, and this possibility was explored.

Exhaustive testing produced a method of inducing favorable residual stresses without surface deformation. Such stresses could be produced in freight-car springs by using a well-agitated oil quenching bath and a draw temperature of 275 deg F. This was a radical departure from the generally accepted draw temperature of between 700 and 800 deg F. Preliminary tests had shown that the average endurance of springs heat treated in the conventional manner was between 300,000 and 400,000 cycles. It was learned that a minimum endurance limit of 1,500,000 cycles could be made an inspection requirement for springs heat treated by the low-temperature draw method. Shortly after this, however, the shot peening method for producing beneficial surface stresses in springs was introduced and has been generally accepted by the manufacturers.

Now the CN began to consider its heat treatment as a possible method for spring reclamation. Tests showed the effect of the low-temperature draw treatment on springs removed from service for loss of height. Hundreds of used springs were measured, weighed, brought back to standard height and heat treated to explore the feasibility and economics of reclamation. They were checked for free height, loss of height, load-carrying ability, and endurance characteristics.

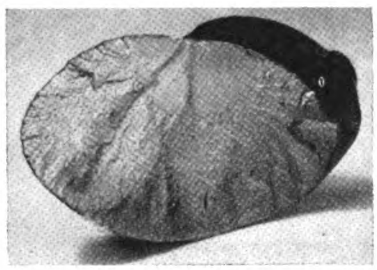
This work proved conclusively that used springs over a certain minimum weight could be rendered equivalent to new springs with proper metallurgical treatment. The low-temperature draw treatment increased the endurance limit of the reclaimed spring to above 1,500,000 cycles as it had been found to do with new springs.

Reclamation is under the technical control of a metallurgical engineer. The process has seven stages:

- All springs removed from freight cars for any reason are gauged for free height. All type D coils with free

(Continued on page 45)

Air-powered device stretches spring to established height. Operation is done at 1600-1625 deg F.



Spring failure, a typical one, began at inner-surface fatigue crack.

Endurance test machine with 15-hp motor counts cycles to failure.

ave them coupled! John Deere Rotoboo straightens car ends where they stand!

The highly mobile John Deere Rotoboom rolls to the job on tractor power . . . straightens the ends of coupled cars where they stand.

Power head is equipped with a working tool on one end, pads on the other, enabling operator to work on either car in turn. Head rotates hydraulically up to 210 degrees. Entire boom can be swung in one full circle around the tractor, and is raised, lowered or extended as required to work the tool from left to right and top to bottom. One man does the job in ten to fifteen minutes.

Operator can also place the three-cylinder ram vertically on the ground, slide it under cars as a jack for changing wheel-truck springs. Hydraulic working pressure is 2000 psi, developing a capacity of 50 tons. Rotoboom is detachable, freeing tractor-loader for use in loading or cleanup work. The Rotoboom also mounts on John Deere Crawler Tractors.

For details, see your dealer listed in the yellow pages or clip and mail coupon today.

JOHN DEERE

LOADERS • MOWERS
MAINTENANCE EQUIPMENT

John Deere, 3300 River Drive, Moline, Illinois
Please send folder B701 detailing Rotoboom applications.

NAME ____________ POSITION ____________

RAILROAD ____________

ADDRESS ____________

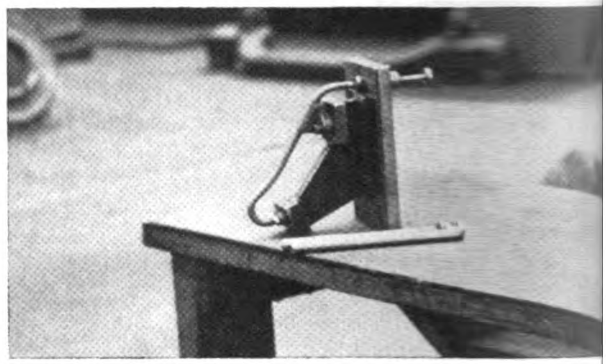
CITY ____________ STATE OR PROV. ____________

Diesel Repair Time Savers

Compressor Stand

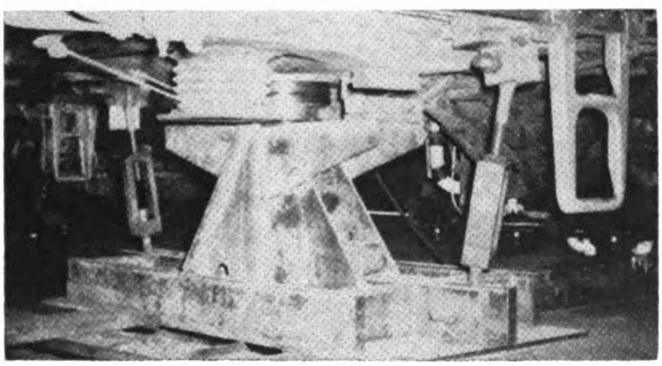
A fulcrum type stand is used at the Milwaukee, Wis., shop of the Milwaukee Road to facilitate the disassembly and assembly of locomotive air compressors. The indexing holes in the side frame of the compressor-base-support make it possible to lock it in various positions so that the compressor crankcase is held in such a way that the cylinders, pistons and rods, and heads can be removed or applied vertically. Either two-cylinder or three-cylinder types of compressors can be accommodated on this positioning device.

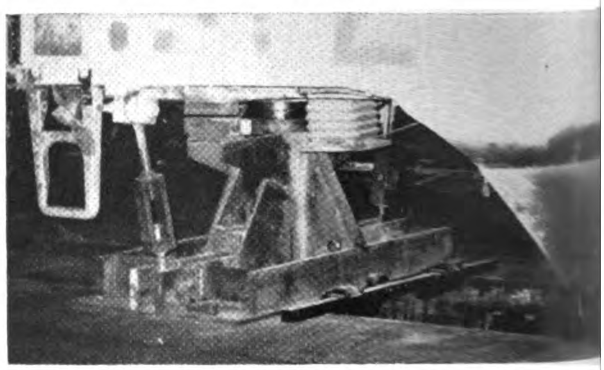
Alignment Jig



A jig for checking the alignment of EMD piston cool pipes, which run from the engine cooling oil manifold a are bolted to each cylinder liner at the bottom, has be developed by the Northern Pacific at its Livingston, Mo locomotive repair shop. When the pipe is bolted in po tion on the jig, the pilot gauge should enter the pipe ab 1¼ in. to insure correct alignment for proper oil flow the piston. Alignment of this pipe is critical, because it delivers lubricates the wrist pin and cools the crown the piston.

Sante Fe Straightens Diesel Carbodies



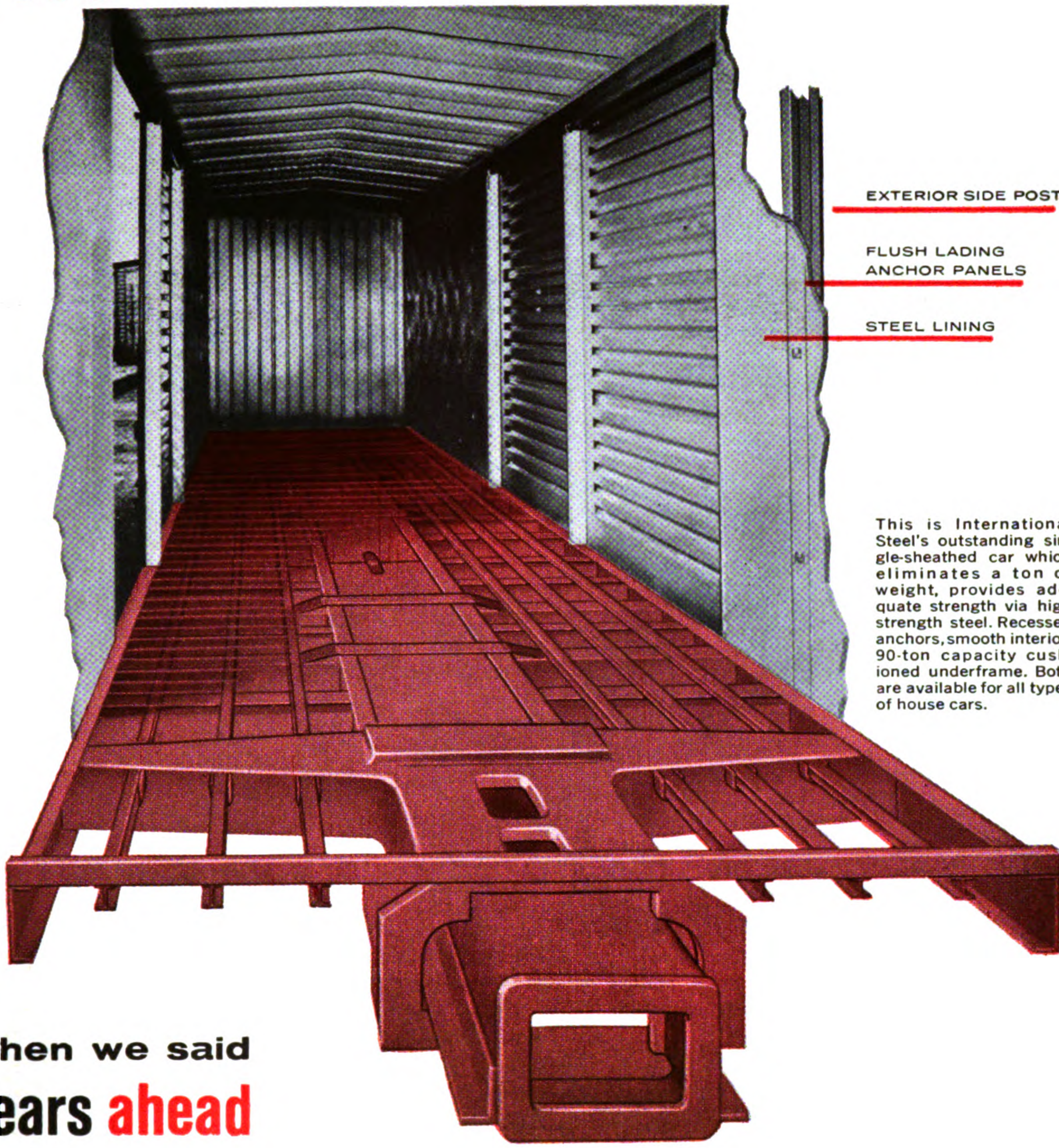


The problems of removing the twist from carbody structures of locomotives and holding them in this position while the frames are straightened and the carbodies rebuilt led the Santa Fe shop at Cleburne, Tex., to develop a pair of specially designed pedestal tie-down devices.

Each device is built on a platform of ¾-in. steel plate, 148 in x 120 in. Two bars of 2-in. x 9-in. x 120-in. steel having a 2½-in. hole 6 in. from each end, are welded edgewise 4½ in. on each side of the platform's center line. Two 2-in. x 9-in. bars, 84 in. long, are welded near the edges of the plate. In the center of this platform a center casting pocket was installed on top of ¾-in. gussets, 39 in. high. Four of these plates were welded on the center bars of the platform. Four ¾-in. steel plates were also welded at the sides of the center casting to form side-bearing supports, a safety precaution.

The two tie-down devices, fabricated of 4-in. x 6-in. bars, go inside the heads of the rail, securing the pedestal to the track. A pair of turnbuckles formed of 2-in. diameter steel with ball-bearing seats were forged and clamps made to attach the tu buckles to the ends of the carbo bolster. With the pedestal secured the rail, the carbody is set in pla Turnbuckles are clamped to each e of the pedestal. It is then possible pull the framing into alignment, moving any twisting. This can then held while the members are be straightened and strengthened and t underframe is being repaired. If t carbody has received severe impa it is sometimes necessary to use 3 ton air jacks in the frame-straighten process.

this is what we meant...



This is International Steel's outstanding single-sheathed car which eliminates a ton of weight, provides adequate strength via high strength steel. Recessed anchors, smooth interior. 90-ton capacity cushioned underframe. Both are available for all types of house cars.

. when we said 0 years ahead engineering!

When International Steel's famous underframe was first developed, its superior resistance to stress, strain and shear was sometimes considered to be somewhat superfluous.

Today, with longer, heavier, faster cars and higher draft gear requirements, the design capabilities at International Steel have suddenly become **not** superfluous but **necessary** for safety **and** revenue.

Because we were designing for today's requirements 10 years ago, we are producing 50 to 90-ton capacity underframes with various cushioning devices on a production-line basis for delivery **today!**

But, because we're **still** designing 10 years ahead, 50 to 90-ton is not **our** capacity. Double it, if you will; we have it on the drawing board and can put it into metal for you.

INTERNATIONAL STEEL

R-581

TERNATIONAL STEEL COMPANY • RAILWAY DIVISION • EVANSVILLE 7, INDIANA

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted by LMOA members, those sent to the Editor by other readers are welcomed and published.

Shorted Grids

Several traction-motor field-shunting resistors on GP-9 and GP-18 units have suffered damage from excessive flashovers between the adjacent resistor grids on the same frame. What operating conditions could cause this failure? What modification or tests can be made to eliminate or control this?

After careful inspection of the failed resistors, a check was made of the mounting and location of the electrical potential between adjacent grids on the same frame and of the electrical control system of the failed diesel.

Inspection of the locomotive units indicated extensive damage had resulted from flashovers between the two center resistor plates connected to the terminals marked RF 4 and R 2, or RF 1 and R 3. The GP-9 and GP-18 traction-motor fields are connected through the reverser to the generator positive and negative potentials. The use of traction motors 1 and 3 or 2 and 4 on the same field-shunting resistor unit will result in full generator voltage less the voltage drop across the field coils at all times between the two center resistor grids.

High peak voltages, plus some dirt or moisture on the grid insulator, could cause a flashover between the two grid sections that would result in burning and arc damage to the resistor plates. A careful check of the control system indicated the power contactors were opening under power and ground relay action was resulting from the flashed resistor grids.

A transition circuit check determined the 1,000 MFD capacitor was defective and a capacity checked showed it to be open. A failed capacitor would result in loss of time delay during transition and would set up voltage peaks that could cause flashovers, ground relay action, and dropping of power contactors under load. This condition could result in the arc damage to the field shunting resistor banks.

To eliminate defects:

- Check the capacitance of all 1,000 MFD transition capacitors at least during annual inspections and replace any unit testing under 500 MFD.
- Modify the field-shunting resistor banks so that traction motors 1 and 2 are connected to the same resistor frame and 3 and 4 motors are connected to the second resistor frame. This simple modification can be made by interchanging R 1 and RF 1 leads with RF 4 and R 4 cables. It will be necessary to extend R 1 and RF 1 cables approximately 9 in.

The wiring changes will eliminate high voltage differential between adjacent resistor grids on the same frames and the control of capacitor values should control voltage surges during transition.

C. J. Frey, electrical department foreman, Rock Island.

Cleaning Coolers

Can oil coolers and radiators be kept clean by any new developments which avoid, or at least lower the cost of cleaning resulting from the present method of taking them off the locomotive for cleaning?

Discussion of this problem will be limited to the oil side of the oil cooler, because it is presumed that methods of keeping the water side clean are well known to all. In many respects, the concepts are similar, although the media and terminology differ.

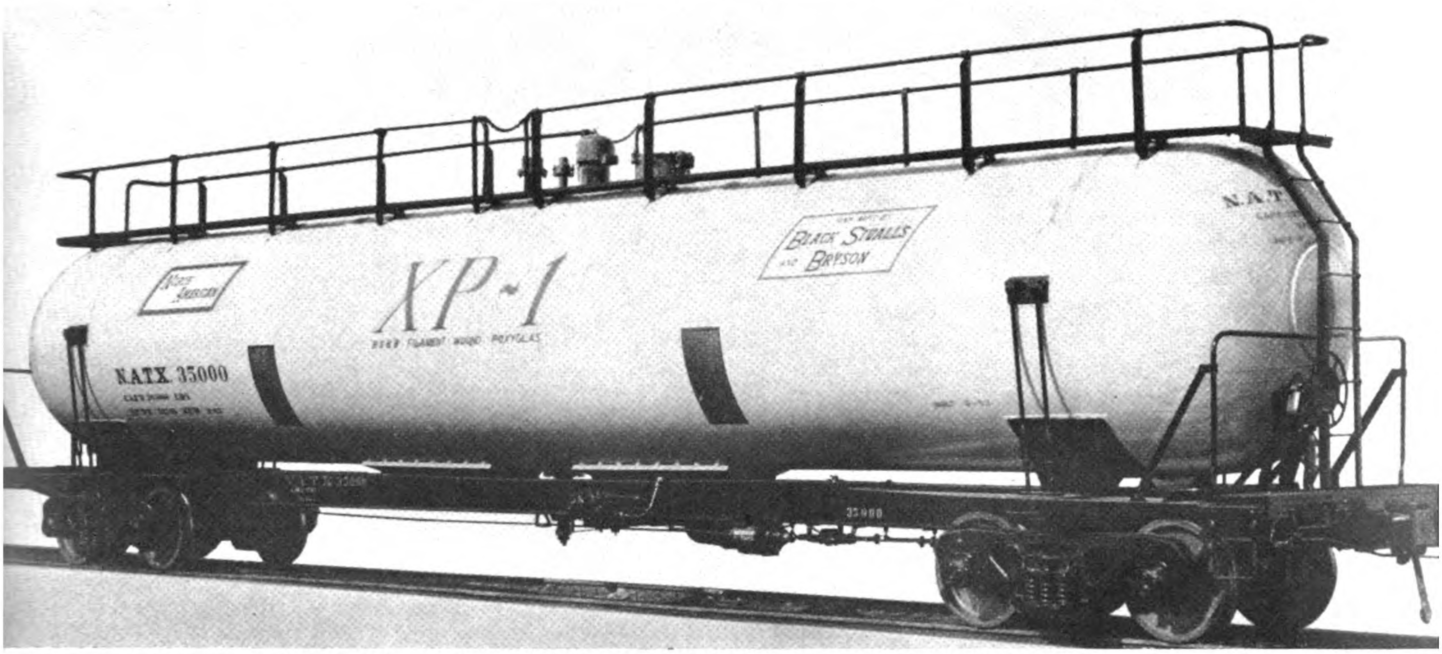
Oil coolers need to be cleaned because oil contaminants are deposited on the heat-exchanger surfaces and in the spaces provided for oil flow. If the oil did not carry any contaminants, then oil coolers would remain clean for an indefinite period. No way has been found to operate an engine without some oil contamination. It is necessary to control the amount and physical state of the contaminants so that they will be removed by the oil filters instead of the oil cooler. This requires good engine conditions, good oil filtration, and an oil of suitable quality with ability to disperse the contaminants and keep them suspended until they can be filtered out. Control of these factors can lead to very long intervals between the times when the oil cooler actually needs to be cleaned.

While we do not know of any new developments to keep oil coolers clean, control over the following factors will go a long way toward this:

- The use of lubricating oil which remains stable to oxidation and maintains adequate dispersion throughout its period of use. This requires selection of a good oil; then laboratory analysis of the oil at frequent intervals while it is in use.
- The keeping of oil filtration at the best possible level. Watch amount of insolubles carried by the oil and change filters as indicated.
- The adoption of standards which require that oil be changed before oxidation has become serious. Include flash point, viscosity, pentane-benzene insolubles and total acid number in the evaluation of the used oil.
- The changing of oil when additive is depleted to rating of "Fair" or lower as outlined in the 1962 report of the LMOA Committee on Fuel and Lubricating Oil.
- The correcting of faulty combustion as soon as possible after it is indicated by excessive lowering of crankcase oil flash point and or high oil insolubles.
- The providing of adequate air cleaning.
- The keeping of free water out of the crankcase oil. An aid to this is discovery of water leaks through analysis of the oil for presence of water treatment chemicals and correction as soon as possible after this condition is found.

Although the best method of cleaning EMD oil coolers still seems to involve removing them from the locomotive, cleaning of Alco oil coolers in place can be quite satisfactory. Our railroad, using these controls, has had F-7 and GP-20 locomotives operate 500,000 miles without oil-cooler trouble. Alco's are cleaned in place about once a year as routine part of their annual inspection.

T. A. Tennyson, engineer of tests and sanitation, Cotton Belt.



ıent-wound, glass-reinforced-plastic tank is nine tons lighter than comparable 22,500-gallon steel tank. Underframe is conventional.

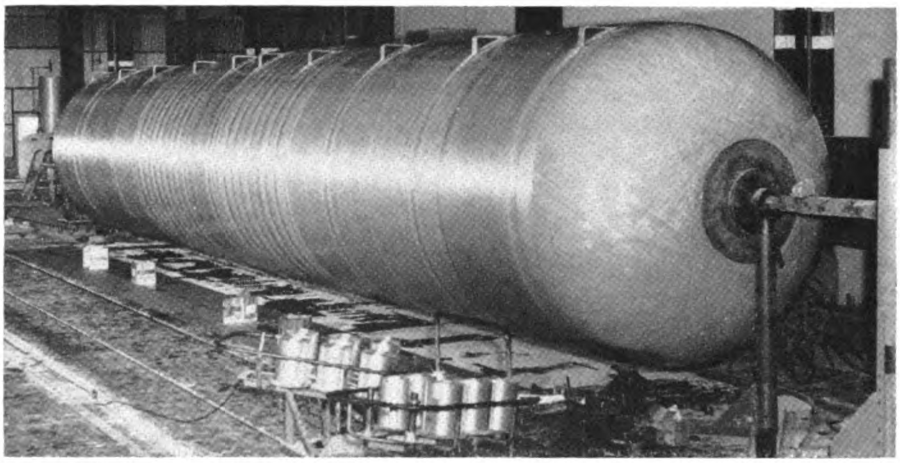
;lass-Resin Tank Cuts Car Weight

ı tank car with a 22,500-gal fila-ıt-reinforced epoxy tank, nine tons ter than a comparable steel unit, just been placed in service by th American Car Corp. The Poxy- glass-resin shell on the XP-1 tank is also corrosion resistant.

'he method used for manufacture 'oxyglas tanks, a patented filament ding technique, consists of im- ;nating continuous strands of ex- ıely small, high-strength, glass fila- ıts (60% by weight) with liquid xy resin (40% by weight), wind- them over a mandrel in a precisely trolled pattern and curing to form ırd homogeneous single structure. ment winding combines the chemi- resistance of epoxy resin and the ngth of continuous glass filaments.

'he Poxyglas tank was produced by :k, Sivalls & Bryson, Inc., Kansas ', Mo., utilizing the same methods ł to build stages of the Minuteman Polaris missiles. The car was as- bled by North American. Advan- s of the construction are said to be extremely high payload to gross ;ht ratio, the resistance to cor- on, and competitive cost.

ıpplication of space-age technology 'reight-car construction has been lained by E. C. R. Lasher, NAC ident as follows: "Three years we saw the need for a larger, ter tank car for heavy and corro- commodities. We recognized that :r weight of commodity could seri- ly limit the size of possible tank

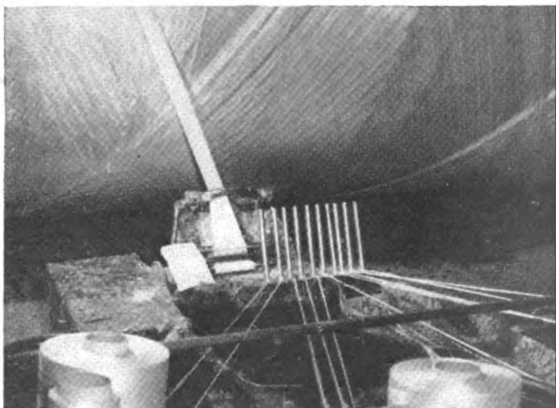


Filament winding operation has been completed. The tank is now ready for the curing oven.

cars. Yet, the railroad's new incentive rates were based on the use of larger cars. We spent nearly two years finding someone to build a plastic tank."

K. W. Lineberry, president of BS&B, reports that "one of our engineers heard about North American's wanting a glass pressure vessel, and we felt if we could produce filament-wound bodies for missiles, we could also make them for railroad use. Our company has been a pioneer in glass filament winding, and we are convinced now that we have found the way to produce tank-car shells."

When the desired wall thickness is reached during the winding process, (approximately ⅜ in. on the XP-1), the tank is baked in a curing oven at about 275 deg F while still on the mandrel. Attachments for the top running board, the tank anchors, and



Glass rovings from separate spools go through resin bath and form flat band for winding.

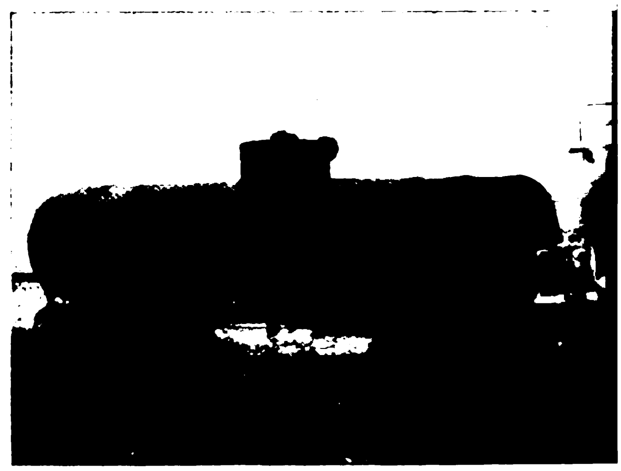
loading and unloading fittings are wound into the shell. Curing transforms the liquid epoxy to a solid which bonds the glass and attachments together. After the tank has been so cured, it is removed from the oven and allowed to cool. It is then taken to the stripping area where the tank is separated from the mandrel. The ends are fabricated from materials produced in the same manner as the shell. The material is then molded into shape, using pressure molding techniques. Inside diameter of the tank at its center is 103 in.; at the ends, 100 in. Length over tank ends is 55 ft 1⅞ in.

The BS&B filament winding technique is incorporated primarily in a hydraulically actuated filament- winding machine. This machine consists basically of servo-operated chamber-rotation and glass-resin supply systems. It is driven by a programming controller which establishes the geometry of the chamber windings. Such controllers are of universal design so they can be readily interchanged or adjusted to facilitate winding different geometric shapes and sizes on one machine. This system maintains exacting tolerances and insures repeatability and reliability.

Storage tanks made of Poxyglas for agriculture, chemical, soap and detergent, food, bleaches and other products are said to be virtually maintenance free inside and out. Because the interior walls of the tank are extremely smooth, there is nothing for solutions to cling to. Usually water will clean the interior sufficiently to permit handling of different compounds. Poxyglas tanks have low thermal conductivity. They are said to be unaffected by extreme heat or cold, and have been tested in temperature ranges from minus 65 deg F to plus 175 deg F.

The 100-ton capacity car has a welded, all-steel underframe, including Z-26 center sills with built-up draft sills, bolsters, and tank saddles; high-capacity friction draft gears and Type E couplers. The trucks are equipped with 6½ x 12-in. roller bearings and 36-in. wheels. Air brakes are truck-mounted with load-compensating features.

Length of the car over strikers is 57 ft 4 in.; over end sills, 47 ft ½ in.. and width over side sills, 9 ft 6 in. The extreme height of car is 15 ft 1 in., and height from rail to top of running board, 13 ft 4 1/16 in.



The double-bubble HD tank

Largest Tank

The world's largest tank car — with a capacity of 5
000 gallons — has just been completed by Union Ta
Car Co. It has an overall length of 89 ft over the stri
and a maximum weight, when loaded, of 440,000
The tank, instead of being the conventional cylindr
shape, is what Union Tank has chosen to call a "dou
bubble" through its center section.

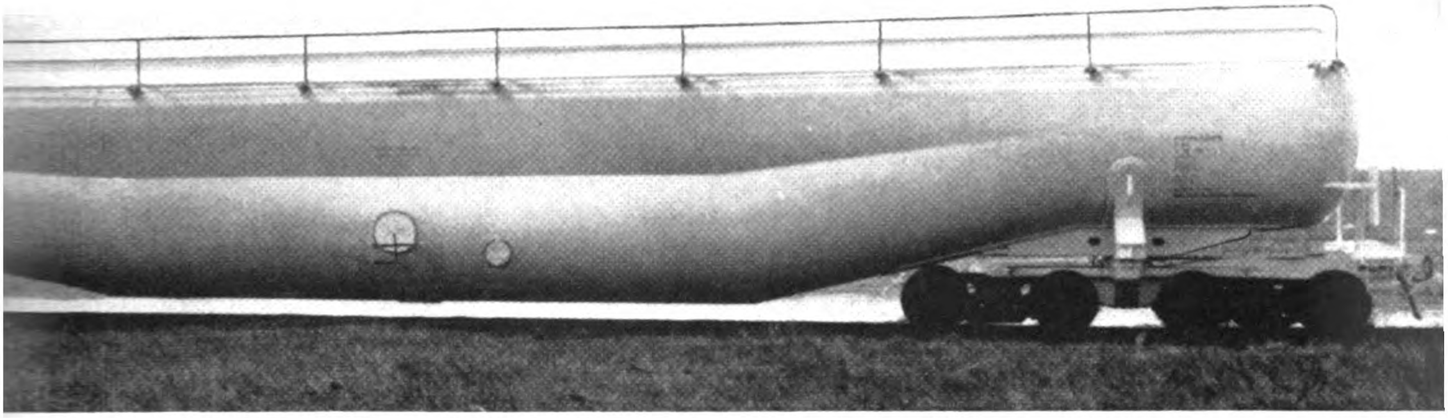
This tank is designed to carry shipments of 200
lb of liquified petroleum gas (LPG) under pressure
241,000 lb of anhydrous ammonia. Each end of the
is mounted on a pair of standard 70-ton, four-whe
roller-bearing trucks over which is a span bolster on wh
the body bolster rests. This span bolster also carries
draft gear and coupler.

"The car is unique in its field," says D. C. Gra
Union Tank vice president. "The 50,000-gallon tank
was not designed in this size merely for the sake of s
Our foremost objective was to encourage the railroads
reduce rates to shippers because of the economies
handling fewer cars for a given amount of prod
shipped."

In addition to the double-bubble tank for pres
service, other innovations in this design include:

- First pressure-type car on which all loading,
loading and other fittings except safety valves are loca
on the sides of the car low enough to be reached co
veniently from the ground. Previously these have alw
been installed on the manway cover at the top of the c
With this 50,000-gallon design, it is possible to load
unload the car at points where there are no loading rac
it is never necessary to climb to the top of the tank.
- First car to be equipped with dual fittings, mak
possible the loading and unloading from either side
from both sides simultaneously.
- First tank car with two four-wheel trucks at e
end.

The car construction follows the Union Tank pate
HD (Hot Dog) design, which was incorporated i
what was then the world's largest tank car when it w
introduced in 1960, a unit with a capacity of 30,000 g
lons (RL&C, June 1960, p. 40). Actually the HD d
sign was first tested in a 10,000-gallon prototype tank



ɔOO-gallon car which dwarfs the older 8,000-gallon car (left). Large car is 91 ft long coupled; short car is 37 ft.

s 50,000-Gallon Capacity

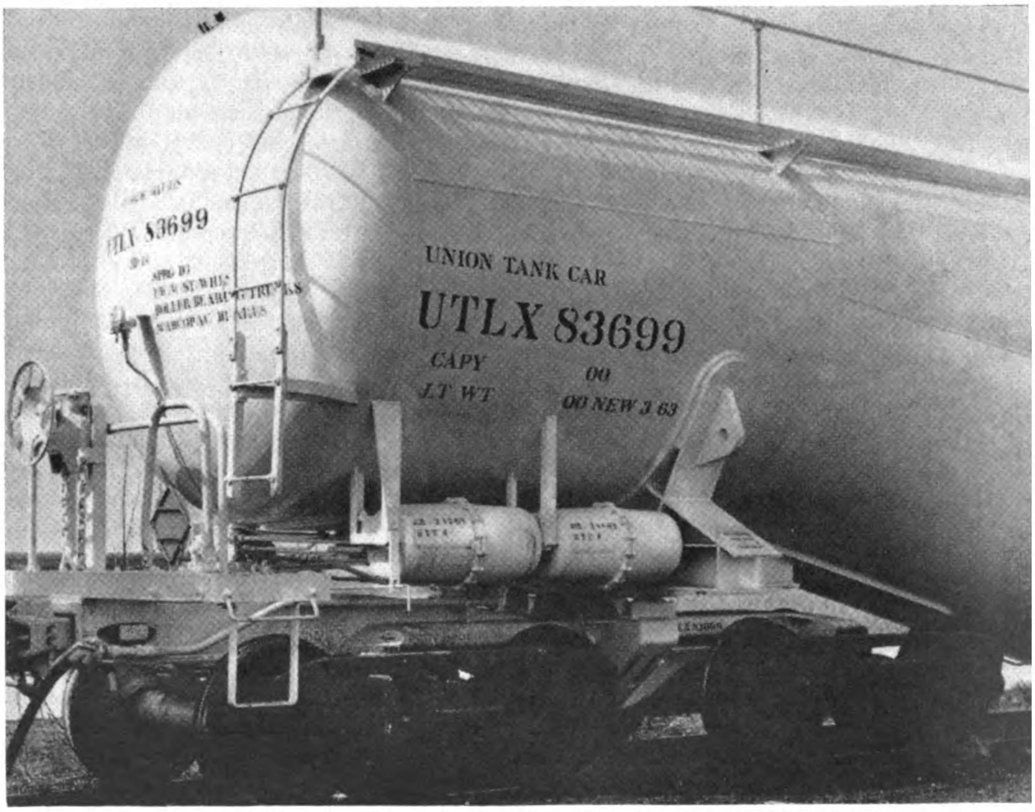
ɔ7, and in a larger 20,000-gallon-
l in 1958.

HD cars, the conventional center eliminated by utilizing the structural strength of the tank. The cradles ody bolsters are welded integrally : tank.

ɩe tank on the 50,000-gallon car sts of two partial horizontal ders, one welded on top of the ·. Each comprises about two-s of a complete cylinder. At the ion of the cylinders, an internal ontal plate, with spaced circular ings, joins the sides for the length ıe double bubble. Union Tank ıeers say that a non-circular cross-on results in a much larger tank ı given length than would be pos-with a circular cross-section with-ındard clearance limits.

he width of the tank at the center ıe car is 9 ft. Tank depth varies ı 9 ft at the ends over the trucks 2 ft 8 in. at the center.

he car is fitted with a specially gned gauging mechanism consist-of a magnetic float and calibrated net-tipped flexible rod. This is l for measuring the liquid level ın the tank.



Body bolster is welded directly to tank just outboard of transition zone. Span bolster under this carries couplers and draft gears. It rests atop the pair of standard 70-ton trucks.

'nion Tank reports that the car's ensions meet all AAR require-ıts for length, width and height of operated in regular interchange 'ice. Coupled length of the car is ft 7 in. Truck center distance is 't. Extreme height is 14 ft 8½ in. : car has standard 33-in. wheels. ht weight is 175,000 lb.

'atents are being sought covering car's tank configuration. "The development makes it possible to produce from relatively thin metal and by economical fabrication techniques a tank car that is operable at relatively high internal pressure," says Mr. Graves. "It also satisfies the regulations covering railroad vehicle size and shape."

Before the car is released for service, it will undergo two series of tests for a period of six months or longer. The first series will be performed at the Union Tank development laboratory. The second will include the accumulation of data under actual operating conditions. Impact tests will be made to prove the car's structural strength and durability.

Union Tank recently reported that the 50,000-gallon car is part of its program to prepare for a continuing trend to higher capacity equipment.

From the Diesel Maintainer's Note Book

Semiconductors—Not on the Extra Board

By Gordon Taylor

Doc Watts, diesel supervisor, and the maintainers at Centerville diesel shop had been studying instruction manuals and wiring diagrams for the GP-30 Electro-Motive units which were about to be delivered. Everyone had become interested in the new static control devices.

One of the enginemen had been heard to remark: "Up to now, I thought a semiconductor was one of our conductors working part time on the extra board. From what you maintainers say, it is a gadget reliable enough to work full time on the control board of a GP-30."

The first GP-30 unit had just been received at Centerville. Doc, with several maintainers, was checking over the unit to learn first hand some of the differences between it and the older locomotives. "Let's start the engine," Doc said, "and see if there is anything special or different."

His men operated all the switches and controls they were accustomed to using in starting engines on the older units. When the starter button was pushed, the engine failed to turn over. They checked the 400-amp fuse and found no trouble there. The Isolation Switch was in start position and the main battery switch was closed.

Doc did not seem worried. "OK Doc," Bill Sparks said; "we have overlooked something. What's wrong?"

"That something," said Doc, "is one of the things that does not appear on our old units. I thought this would be a good way for you to meet it and remember it. This unit, you will recall, has a turbocharged engine. The turbocharger requires the aid of a special motor-driven lubricating-oil pump which comes into action when the engine is started. It also operates for a 15-min. period when the engine is shut down. The operation of the turbo lube-oil-pump motor depends on the Turbo Lube Pump circuit breaker which must be 'On.' If you close that breaker, the engine can be started."

When the circuit breaker was closed, the engine was started without further trouble. The circuit breaker energizes Fuel Prime and Engine Start Switch and GS contactor.

"I think," said Doc, "that this would be a good time to explain this feature more fully. Let's follow the schematic wiring diagram to trace the Turbocharger Auxiliary Lube-Pump Circuit. When the main battery switch is closed with the turbo lube-pump circuit breaker 'On', the pump operates to supply lube oil to the turbocharger. A white light will come on at the engine control panel to indicate that the pump is running. This pump operation is necessary in order to lubricate the turbocharger prior to starting the engine and to insure proper turbocharger lubrication until the engine-oil pressure builds up after the engine is started. The motor-driven auxiliary pump will automatically stop after approximately 15 minutes.

"Whenever the engine is shut down after operation, the pump starts automatically to supply lube oil to the turbocharger for cool down. The pump will run for approximately 15 min after the engine has stopped. The main battery switch and turbo lube-oil-pump circuit breaker must remain closed for at least 15 min after engine shut down. A guard is provided over the circuit breaker switch to prevent its accidental movement to 'Off'.

"Closing the main battery switch will energize BP wire. Current will then flow through the closed turbo auxiliary pump circuit breaker, though normally closed contacts C-D and EF of NVR to energize turbo-lube-pump contactor (TLPC) and turbo lube-oil time delay relay (TLTD). As TLTD is energized, it starts a timing cycle which gives contacts 3-5 and 6-4 a 15-min drop out, during which time the auxiliary pump operates. Each time TLTD is energized, it restarts this timing cycle, insuring proper lubrication to the turbocharger.

"When the engine starts and is running, C-D and E-F contacts of NVR open. TLPD is held in through the E-F contacts of TLPC. As the ti[me] cycle runs out, TLTD contacts 3-5 and 6-4 open to drop out TLPC, stop the pump and cause the indica[tor] light to go out.

"As the engine shuts down a[fter] operation, the NVR contacts D-C and E-F return to their normal closed po-sition. The closing of these conta[cts] allows current to flow to and energ[ize] TLPC and TLPD. The time cy[cle] starts on TLTD contacts, whi[ch] causes the auxiliary pump to sup[ply] lube oil to the turbocharger for 15-min cool down, during which ti[me] the white indicator light will be O[n]. Continued oil circulation is necess[ary] for this period to protect the turb[o] bearings from retained heat in t[he] turbine. This "soak-down" oil pu[mp] carries the residual turbine heat to t[he] oil-pan sump.

"All of these events occur autom[at]ically if the man who shuts the eng[ine] down remembers to leave the ma[in] battery switch and turbo-lube-oil pu[mp] circuit breaker closed. Particular a[t]tention should be given the spe[cial] instruction plate located just above t[he] Main Battery Knife Switch. It cauti[ons] against opening the switch until [15] min after engine shutdown."

At this point one of the maintain[ers] asked: "What happens if the eng[ine] is restarted during the time the tu[rbo] lube-oil-pump motor is operating du[r]ing the 15-min cool-down cycle?"

"The answer to that," said Do[c], "is that the NVR would be energ[ized] and its E-F contact would open t[he] circuit both to TLTD time delay a[nd] TLPC turbo lube-pump contac[tor]. This action would stop the mo[tor-]driven turbo lubricator pump. Lub[ri]cation would then be supplied to t[he] turbocharger by the engine-driven pump in the regular manner.

"To more clearly understand t[he] turbocharger lubrication system, [re]member that its oil supply is obtai[ned] from the engine lubrication syste[m] through a connection to the center [of] the upper idler gear stub shaft. T[he] oil is then externally channeled t[o] cover plate where external piping [de]livers it to the turbocharger body.

This series of articles based on actual experiences of men who operate and maintain diesel-electric locomotives.

ing the turbine bearing. Leaving turbocharger, oil empties into the r gear-train housing and drains :k into the oil-pan sump. A lube-oil : from the turbocharger lubrication tem connects to the engine governor low-oil-pressure shutdown.

'The auxiliary turbocharger oil np draws its oil from the sump and charges it through a filter into the bocharger at a tee connection with shutdown line to the governor. A :ck valve in the line between the tee mection and the pump prevents d back when the pump is not oper-ıg. I feel that we have said enough »ut the turbocharger lubricating tem to establish its importance.

'While we are discussing things in-ved in starting the engine," said c "I want to call your attention to Fuel Prime and Engine Start itch. It is different from the starting tches on our older units. The switch a two-position rotary switch used h for fuel priming and engine start-. It is located on the Engine Control nel on the electrical cabinet that ms the rear wall of cab.

"To start the engine, the Isolation itch must be in Start position. Then : rotary switch must be turned to : left to the Fuel Prime position and d 10 to 15 sec to operate the fuel mp. Following this, the rotary itch is turned to the right to the gine Start position and held for ap-›ximately 15 sec until the engine rts. Placing the rotary switch in the gine Start position establishes cir-.ts to close the starting contactor ;, which allows battery current to w through the starting windings of : main generator to crank the en-ıe. It also provides a circuit to close : fuel-pump contactor supplying fuel · starting."

At this point Bill Sparks asked: 'oc, are there any other new devices it we should know about that would erfere with engine operation?"

"There are many other devices we ll have to learn about," replied Doc, ut we'll have to consider them care-ly as different situations arise. You ve just learned of a device that in-feres with starting the engine unless ›perly handled. I am now thinking one that could cause an engine to 'p during normal operation. What you suggest as probable causes?"

"How about these?" asked Bill. He :ntioned:

- Engine overspeed tripped:
- Low-oil button on governor out;
- Throttle moved to 'Stop';
- Auxiliary generator 30-amp and 150-amp fuses may have opened;
- Insufficient or no fuel;
- FPC de-energized.

"None of these answers my question," said Doc. "The one I have in mind is that the Engine Protector Switch may have tripped."

"What do you mean by engine protector?" asked Bill.

"On the GP-30," Doc explained, "there is a device known as the Crankcase Pressure Switch, identified on the wiring diagram as CP. This CP switch is referred to in the instruction manual as the Engine Protector, operating in case of excessive oilpan pressure.

"With a brand-new unit, there is little likelihood of high crankcase pressure, but it is well for you to be acquainted with this device and learn how it affects the operation of the engine. It is a pressure switch with oil-pan pressure acting against a diaphragm-operated trip it exceeds a predetermined setting.

"When tripped, a red lamp on the switch housing will light. When untripped, contacts 7-2 of the CP switch energize the ER relay which, in turn, energizes the A, B and C governor solenoids to establish speed control of the engine. When the CP switch is tripped, it de-energizes the ER relay which then de-energizes the A, B and C solenoids stopping the engine.

"The switch is reset by a button under the red indicator light on the switch housing. If the switch operates again and the engine is shut down a second time, remove it from the line. The protector switch is then telling you that the engine must be shut down till repaired."

"Let me ask one more question," said Bill Sparks as Doc prepared to get off the locomotive. "It's about the Programming Switch that handles transitions. What provision, if any, is made to safeguard this multi-pole switch against contact failure?"

"That," Doc replied, "has been accomplished by paralleling its contacts in pairs. The overridingf solenoid ORS is energized each time the programming switch is signaled to stop, softening each shunt step.

"There are many new features on the GP-30 unit that deserve discussion; those will have to be taken up at another time," said Doc as he climbed down from the cab. "In the meantime, I urge that you learn all you can about static control devices."

Reclaiming Springs

(Continued from page 34)

height over 8$\frac{1}{16}$ in. are returned to service without further treatment and are not counted as being reclaimed.

- All type D inner and outer coils with free height 8$\frac{1}{16}$ in. or less are collected for reclamation when removed from cars. First the coils are segregated according to weight. All outer coils weighing less than 22 lb and inner coils weighing less than 6 lb are scrapped.
- Springs which meet the weight requirements are heated to 1,650 deg F in an electric furnace having automatic temperature control. The springs, upon removal from the furnace, are reset immediately to a height of approximately 9¼ in.
- After resetting, the coils are allowed to air-cool to a black heat and are then returned to a furnace for heating to 1,550 deg F, following which they are quenched in oil.
- After removal from the quenching oil, the springs are drawn at 275 deg F for 1 hr.
- When the springs have cooled to ambient temperature after heat treatment, they are compressed solid three times to remove permanent set.
- The springs are inspected according to the requirements of the current specification, including the required minimum endurance limit of 1,500,000 cycles.

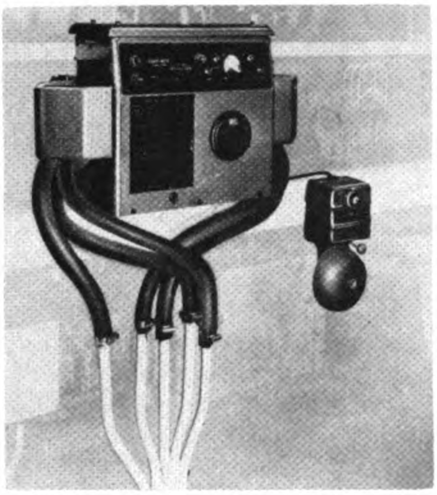
Resetting Method

The resetting operation is performed on a machine powered by compressed air which stretches the hot springs to a predetermined height. The operation is performed within 15 sec of the time the springs are removed from the furnace at 1,650 deg F. At first it was thought that a more complex resetting operation would be required to produce the uniform coil spacing of new springs. However, the simple stretching operation was found to produce spacing between the coils equal to that of new springs.

The entire reclamation process has been very successful and has made a significant reduction in operating costs at a time when the CN must take advantage of all the economies that technology can provide. During the period that the reclamation process has been in use, 115,000 outer coils and 36,000 inner coils have been reclaimed.

What's New

(Continued from page 14)



Oil Mist Detector

By automatically scanning the compartments of the crankcase, the Graviner high-sensitivity Oil Mist Detector will locate hot spots in diesel engines, eliminating the danger of crankcase explosions. Visual and/or audible warning is given on detection of an increase in oil-mist density caused by the hot spot or other malfunction of the engine, and the danger area instantly located. Running and auxiliary diesel engines for power generators, compressors, or rolling stock can easily be equipped with the detector. Fenwal Incorporated.

For more information, circle 5-14 on card following page 52.

Steel Grating

Safetywalk lightweight one-piece grating features a triple-rib design formed with three bracing channels along its length, permitting application as a catwalk or walkway on floors and platforms. The 18-in. width may be slit along the valley of the channels to form 6- or 12-in. widths. According to the manufacturer, snow and ice break off easily and drain through specially constructed weep holes in each channel. The 18-gauge grating weighs 308 lb per 100-sq ft and is said to support 100 lb of

uniform load per sq ft at a recommended span of 4 ft 6 in. United State Gypsum Co.

For more information, circle 5-15 on card following page 52.

Report

(Continued from page 6)

bitt, and by heat generation, progressive oil-film breakdown and resultant galling and melting of the metal. Excessive friction can occur both at low speed and at high speed when the shaft and bearing temperatures begin to exceed 200 deg. F.

Journal surfaces with sharp peaks do not carry load as well as journals with flattened peaks, even though their CLA (center line average) values may be similar. Specification of surface finish by number alone is not sufficient, as the character of the surface is not taken into account. Surface-profile charts are much more meaningful than index numbers.

Journal Performance Reaches All-Time High

An average of 942,637 miles per hotbox setoff was achieved in 1962 by AAR member roads, based on Mechanical Division figures. This was almost 2½ times better than the 394,446 miles per setoff for 1961 and much better than any previous year. Monthly averages for the last three months of 1962 were consistently over a million miles per setoff. For the last three months of 1961 these averages had varied from 574,937 to 865,515 miles. During 1962 a total of 32,809 setoffs were made, compared with 77,373 in the preceding year.

It had been predicted some time ago that the complete elimination of waste packing would see a rather marked improvement in journal performance figures. AAR statistics seem to be indicating that this will be the

HOT BOX STATISTICS

	Cars set off between terminals with hot boxes		Miles per car set off
December 1958	7,511		350,39[illegible]
December 1959	6,121		435,7[illegible]
	Pads	Waste	
December 1960	2,314	3,201	441,44[illegible]
December 1961	2,002	937	865,5[illegible]
1962			
January	2,307	1,078	728,99[illegible]
February	2,133	816	797,81[illegible]
March	2,301	808	868,8[illegible]
April	1,872	625	1,028,9[illegible]
May	2,135	667	962,64[illegible]
June	2,082	684	938,57[illegible]
July	2,311	612	855,44[illegible]
August	2,307	537	918,7[illegible]
September	2,233	395	968,49[illegible]
October	2,296	284	1,063,95[illegible]
November	1,991	202	1,188,30[illegible]
December	1,925	208	1,187,9[illegible]

case. The Mechanical Division has repo[rted] that on June 30, 1962 (latest figures av[ail]able), 89.5% of the railroad-owned c[ars] and 91.9% of the privately-owned freig[ht] cars had been equipped with lubricat[ing] devices. This made the average for the en[tire] tire car fleet 89.8%. A year earlier, on Ju[ne] 30, 1961, this figure had been 77.1%.

In June 1962, when there were 2,7[illegible] hotbox setoffs, the 10.1% of the freight ca[rs] which then had waste packing accounted f[or] approximately 25% of them. A year earli[er] in June 1961, the 23% of the cars th[en] equipped with waste packing accounted f[or] about 75% of the 8,801 setoffs which oc[curred]. For the entire year of 1962, 21.2[%] of hotbox setoffs involved waste-pack[ing].

The AAR research organization is n[ow] aiming to achieve an average of 2,000,0[00] miles per setoff (see p 19). According [to] December 1962 records, 16 railroads a[mong] 103 reporting were able to show this pe[r]formance level. In top place was the Rea[ding] with 5,792,356 miles followed by the M[aine] Central with 3,708,291 and the Texas [&] Pacific with 3,601,542.

Revised Lubrication Manual

The revised edition of the present AA[R] Lubrication Manual, which became effec[tive] Jan. 1, 1959, will soon be ready for distr[ibu]tion. The AAR Mechanical Division has [ar]ranged the first 11 sections to c[over] primarily, lubricator-equipped boxes. S[illegible]

ıns XIII to XX, inclusive, on waste-packed xes have been retained to cover cars in stricted interchange, line or captive service ee P.C. Interchange Rules 3 and 7).

An appendix, with photographs and a ief description of each device, is included show only those lubricators from which pproved for Test" and "Conditional Ap-oval" status has not been withdrawn as of ı. 1, 1963.

The Mechanical Division believes it orthwhile if all railroads and private car es would furnish copies of the revised edi-n to all forces involved in servicing of jour-l boxes. From field checks, it was found that e of the principal reasons for mishandling lubrication matters has been due to lack information as to the proper maintenance all details in the journal box assemblies. pies of the revised edition may be ob-ned from the secretary, AAR Mechanical vision, 59 E. Van Buren st., Chicago 5. st to members or non-members of the sociation: $20.00 per 100 copies; $12.50 · 50 copies; $0.30 per single copy.

echanical Division To Hold nited Business Meeting

e AAR Mechanical Division will hold a nited" business meeting on June 25 and at the Sherman House, Chicago. This eting has been set up because the Octo-11 annual meeting during the American ilway Progress Exposition would be too : to conduct the Division's important bus-ss that affects mandatory provisions of Interchange Rules.

While final arrangements have not been de prior to going to press, it is expected t the June meeting will be similar to the ited meeting held in June 1961 when at-dance was restricted to the Mechanical vision's General Committee, key mem-s of other committees, and interested top chanical officers.

Railway Locomotives and Cars will cover, the July issue, the Mechanical Division orts and the actions taken.

CF Dedicates w Research Center

new ACF Technical Center, dedicated St. Charles, Mo., on April 8, is being rated by the American Car and Foundry ision and will give technological support the division's carbuilding plants in St. is, Huntington, W. Va., and Milton, Pa. purpose of the Center, as stated by ncis H. Boland, ACF vice-president and eral manager of the division, is to de-rolling stock and other equipment that enable the railroads to help shippers ıce their distribution costs.

staff of 225 is housed in two buildings the former St. Charles plant which has ı unused for carbuilding since passenger-production was terminated there several s ago. The fatigue test fixture at the ıt, which is 125 ft long, can accommo-any loaded freight car built today or sioned. It can exert a 1,000,000-lb pull, 1,250,000-lb squeeze, and cars can be d and oscillated to determine effect of ı motion on them. In another test simu-ıg freight-yard-switching action, cars be impacted at up to 20 mph to test their struction and ability to protect ladings.

Supply Trade

McCONWAY & TORLEY CORP.—*Donald Y. Clem,* executive vice president and secretary, elected president, succeeding *Richard E. Bowe,* now chairman of the board.

D. Y. Clem
McConway & Torley

P. N. Strobell
Alco

ALCO PRODUCTS.—*Paul N. Strobell* elected a vice president at Schenectady, N.Y. Mr. Strobell will continue to manage locomotive and engine products division.

PULLMAN-STANDARD, A DIVISION OF PULLMAN INC.—A 100,000-sq ft building has been remodeled at the P-S 111th St. plant, Chicago, and is being equipped for the remanufacture and refurbishing of railroad passenger equipment. Because few

r passenger cars have been built since the nediate postwar years, P-S believes a siderable market exists for such equip- nt. The present P-S passenger-carbuild- facility is being used for construction of nmuter and rapid transit equipment.

ION TANK CAR CO.—*J. W. Van kam* elected president and chief execu- officer.

GEWATER STEEL CO.—*Walter M. e*, vice president-sales, elected vice presi- t and secretary. *William O. Fleming*, nager of industrial sales, named general s manager. *William G. Heiner, Jr.*, nager of railroad sales, named to fill ly created position of assistant general s manager. *Harry B. Ecker*, and *hard H. Rea* appointed district managers, ladelphia and New York, respectively.

ROQUIP CORP., BARCO DIV.—*Robert Haack*, appointed manager of railroad s at Barrington, Ill. Other railroad sales ointments: *Frank J. Thomas*, manager tomer service, Barrington. District man- rs: *Charles O. Jenista*, Chicago Area, c Park, Ill; *Clarence E. Allen*, Western gion, Morago, Calif; *William B. Bley*, w York Area, Hackensack, N.J.; *LeRoy mley*, St. Louis Region, Springfield, Mo.; *sley T. Jones*, Southeastern Region, hmond, Va.

NTINENTAL OIL CO.—*M. B. Abern- y*, railway sales engineer at Fort Worth, c., appointed to newly created position of rdinator of railway sales engineering vices, with headquarters at Houston, Tex.

WIS BOLT & NUT CO.—*Mark Paper* cted president, succeeding *Meyer Paper*, w chairman of Board of Directors.

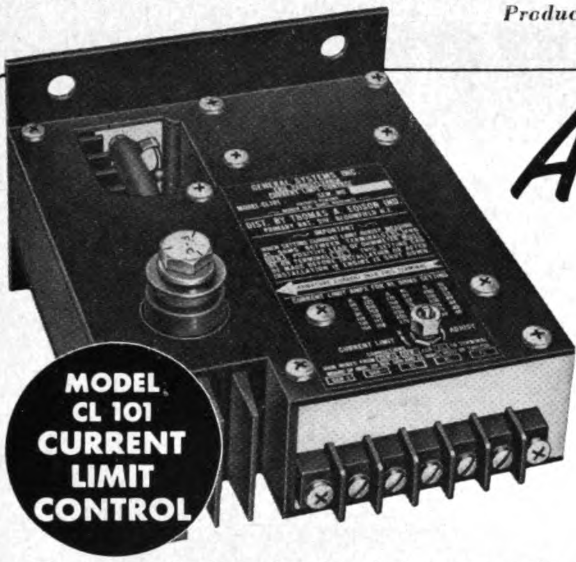
ASTIC STOP NUT CORP. OF AMERI- .—*Donald B. Sorenson*, general sales nager, named director of marketing, stener Division, succeeding *Desmond E. lly*, retired. *Andrew J. Turner* appointed nager of industrial and distributor sales.

MINATOR, INC.—*LeRoy A. Erickson* cted president.

YANDOTTE CHEMICALS CORP., 3. FORD DIV.—*James S. Hubbard* named utheastern district sales manager at At- ta, Ga., succeeding *T. N. Jones*, retired. *hard H. Andrew* appointed district sales nager at Cincinnati, Ohio, succeeding . Hubbard.

OULD-NATIONAL.—Engine Parts Di- ion appointments: *W. E. Wilkening* in rge of all sales, with headquarters in iladelphia, Pa. *D. A. Cowhig* appointed nager, national account sales. *J. O. Lutz* ntinues as manager, sales engineer, re- nsible for original equipment and indus- al sales. Headquarters, St. Paul, Minn.

ESTERN RAILROAD SUPPLY CO., DIVISION OF WESTERN INDUSTRIES, INC.— stern has acquired the *Roc-Wood Floor- Products Corp.* of Chicago, manufac- ers of plastic flooring compound for ight-car use. Sales offices and manufac- ing being moved from 1725 S. Michigan e., Chicago, to Western's Chicago plant, 42 W. 36th Place.



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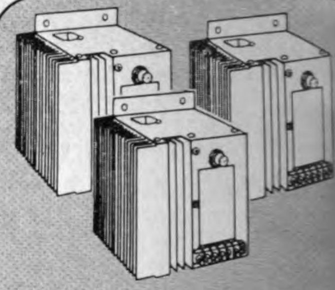

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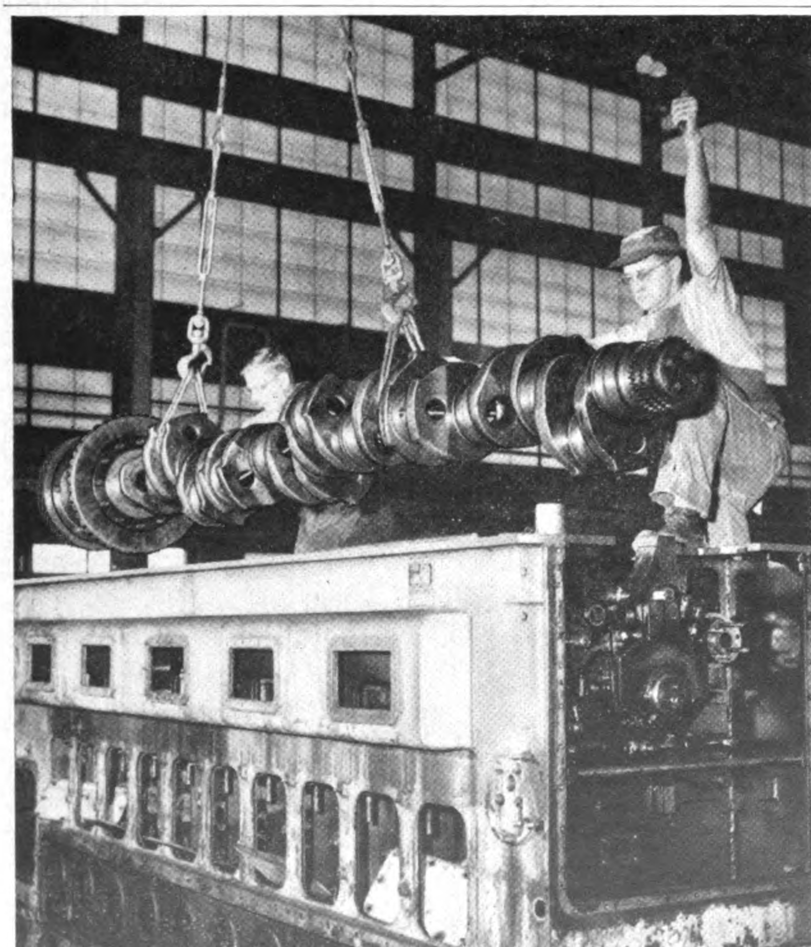

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Personal Mention

R. C. Johnston
PRR

F. G. Fisher
Reading

ıicago & North Western.—*Chicago:* J. D. NEILL appointed assistant superintendent r department. J. S. SORCE now district genal car foreman, succeeding Mr. O'Neill.

ie-Lackawanna.—*Cleveland, Ohio:* H. P. ΓDOR appointed mechanical engineer. *Susıehanna, Pa.:* J. D. RENTZ appointed su:rvisor car repairs, Eastern district. *Meadlle, Pa.:* A. HUGHES, assistant superinndent car department, Western district, ›pointed supervisor car repairs, Western strict.

orthern Pacific.—*St. Paul, Minn.:* R. W. PANNING appointed assistant to general ıechanical superintendent, succeeding A. . SCHLICHTING, retired. H. G. KNUDSEN, :ting shop superintendent, appointed shop ıperintendent, succeeding J. C. BEKEMANS, eceased.

ennsylvania. — *Philadelphia, Pa.:* RICHARD . JOHNSTON, superintendent of equipment, hiladelphia Region, appointed assistant hief mechanical officer-car, succeeding IARRY M. WOOD, retired.

Mr. Johnston began work on the Pennylvania in 1934. He advanced through potions as enginehouse foreman and master ıechanic, then became superintendent of quipment, serving, successively, on the lorthern, Pittsburgh, and Philadelphia .egions.

eading.—*Reading, Pa.:* A. W. FISTER, suerintendent of motive power and rolling quipment, retired. FRANKLIN G. FISHER, ssistant superintendent motive power and olling equipment and mechanical engineer, ppointed to newly created position of chief ıechanical officer.

Mr. Fisher joined the Reading as a mahinist apprentice at Reading locomotive hops in 1938. He was appointed junior en:ineer in 1942, and, later, held various engieering positions until 1960 when he beame superintendent motive power and rollıg equipment and mechanical engineer.

ianta Fe.—*Argentine, Kans.:* D. M. MILLER ppointed superintendent of shops, succeedng J. D. SWAUGER. D. H. BRISTOW named ssistant superintendent of shops—Locomoive Department, and D. L. VINCENT, assistnt superintendent of shops—Car Departnent. *Chicago:* V. R. CARLSON named to ill newly created position of superintendent f shops, with jurisdiction over Chicago Terninal and Illinois Divisions. Previously naster mechanic at La Junta, Colo.

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following this page.)

31. JOURNAL BEARING. "The Expediter Story" describes the SKF cylindrical roller journal bearing and its advantages. Discusses also traction motor armature bearings for diesel locomotives. SKF Industries, Inc.

32. MAINTENANCE GUIDE. Maintenance Guide for Floors, Stairways, Steel Decking, Form No. 6318, includes detailed application and surface preparation instructions for using Rust-Oleum general purpose or heavy-duty floor coverings. Rust-Oleum Corp.

33. ELECTRIC GENERATING PLANTS. Revised "Blue Book" (F-100) gives general background information on Onan electric generating plants and their selection. Describes the three basic types of electric plants—alternating current, direct current, and battery charging—and discusses application and relative merits of each. Studebaker Corp.

34. WELDING EQUIPMENT. Complete West-ing-Arc line of welding equipment, electrodes and brazing alloys described in Booklet J1-10493. Westinghouse Electric Corp.

35. CUTTING TORCHES. Catalog, Form 55031, describes complete line of Oxweld machine cutting torches and accessories for general duty, light- and heavy-duty cutting, portable cutting, and bevelling operations. Linde Co.

36. CRANE ATTACHMENTS. Thirty-nine standard and special attachments for BLH Austin-Western cranes of from 5- to 11-tons capacity described in Bulletin AD-2621. Baldwin-Lima-Hamilton Corp.

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AILWAY .ocomotives nd Cars

JUNE 1963

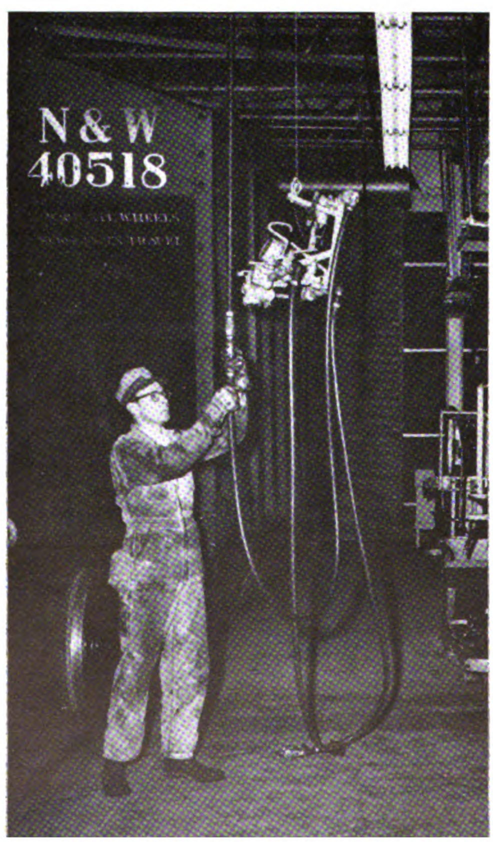
GM Introducing 5,000-hp Diesel-Electric B Unit with Two Engines

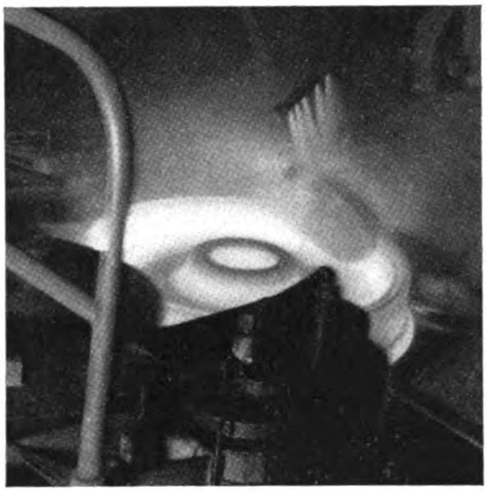
. . . page 53

A Simmons-Boardman TIME SAVER Publication

N&W Consolidates Car Repairs

. . . page 29





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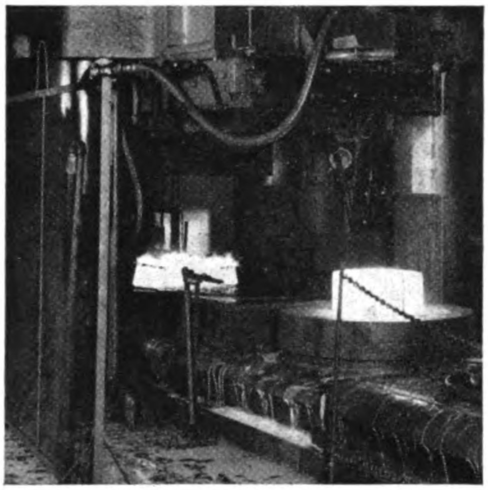

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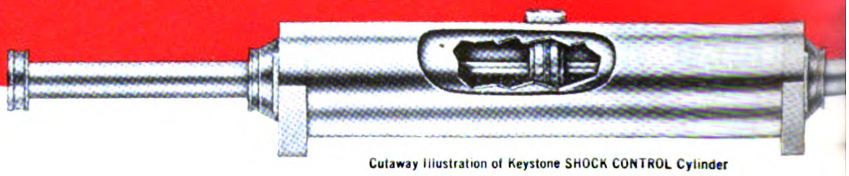

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June, 1963—Vol. 137, No. 6

E SAVING IDEAS FOR JUNE

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Report

Limited Business Session Set by Mechanical Division

A limited annual business session has been scheduled by the AAR Mechanical Division for June 25 and 26. This session, to be held in Chicago over three months in advance of the formal annual meeting of the Division, has been called to "progress the 1963 recommendations for improvements and betterments, and to make other necessary changes in Mechanical Division publications by some means which will meet the requirements of the Articles of Organization and become effective in accordance with the regular established dates."

The need for such a session became apparent months ago when practically all the AAR organizations and most of the trade, supply and shipper groups in the railroad industry agreed to participate in the 1963 American Railway Progress Exposition at Chicago, October 9 to 16. Holding their formal annual meeting then, along with practically all the other groups, will be the Mechanical Division. Actions taken in October could not be submitted to the required letter ballot and printed in time to become effective on January 1, 1964. "Because of the mandatory nature of the rules and regulations of the Mechanical Division," explained F. Peronto, executive vice chairman, recently, "at least a quasi-legal basis is necessary for its developments and its actions."

To proceed with these matters, they will be considered in late June, when the annual meeting is normally held, and can then be submitted for letter ballot at the regular time—usually August. Activities of the formal Mechanical Division meeting in October have not yet been revealed.

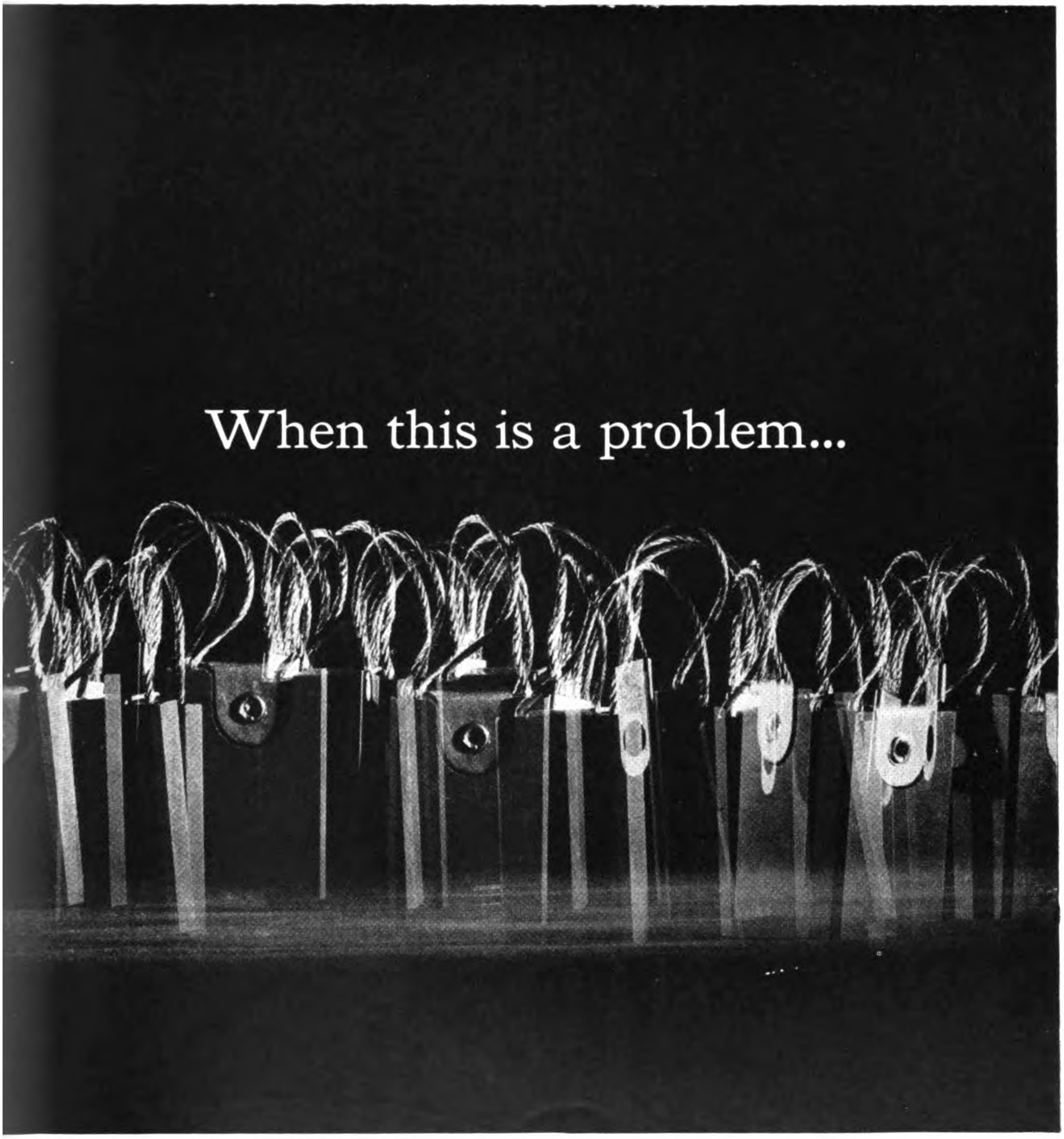
Eligible to attend the limited business session will be the members of the General Committee (chief mechanical officers of 15 major railroads); the chairmen of each of the 14 standing committees; the vice chairmen and subcommittee chairmen of standing committees, if required; chief mechanical officers of those roads not represented on the General Committee; and representatives of the mechanical staffs of member roads. Attendance is limited to a total of three representatives from each member road, exclusive of those serving on Division Committees.

Procedures and attendance qualifications will be similar to those imposed in 1961 when economy measures forced the Mechanical Division to cancel its annual meeting and hold only the limited annual business session.

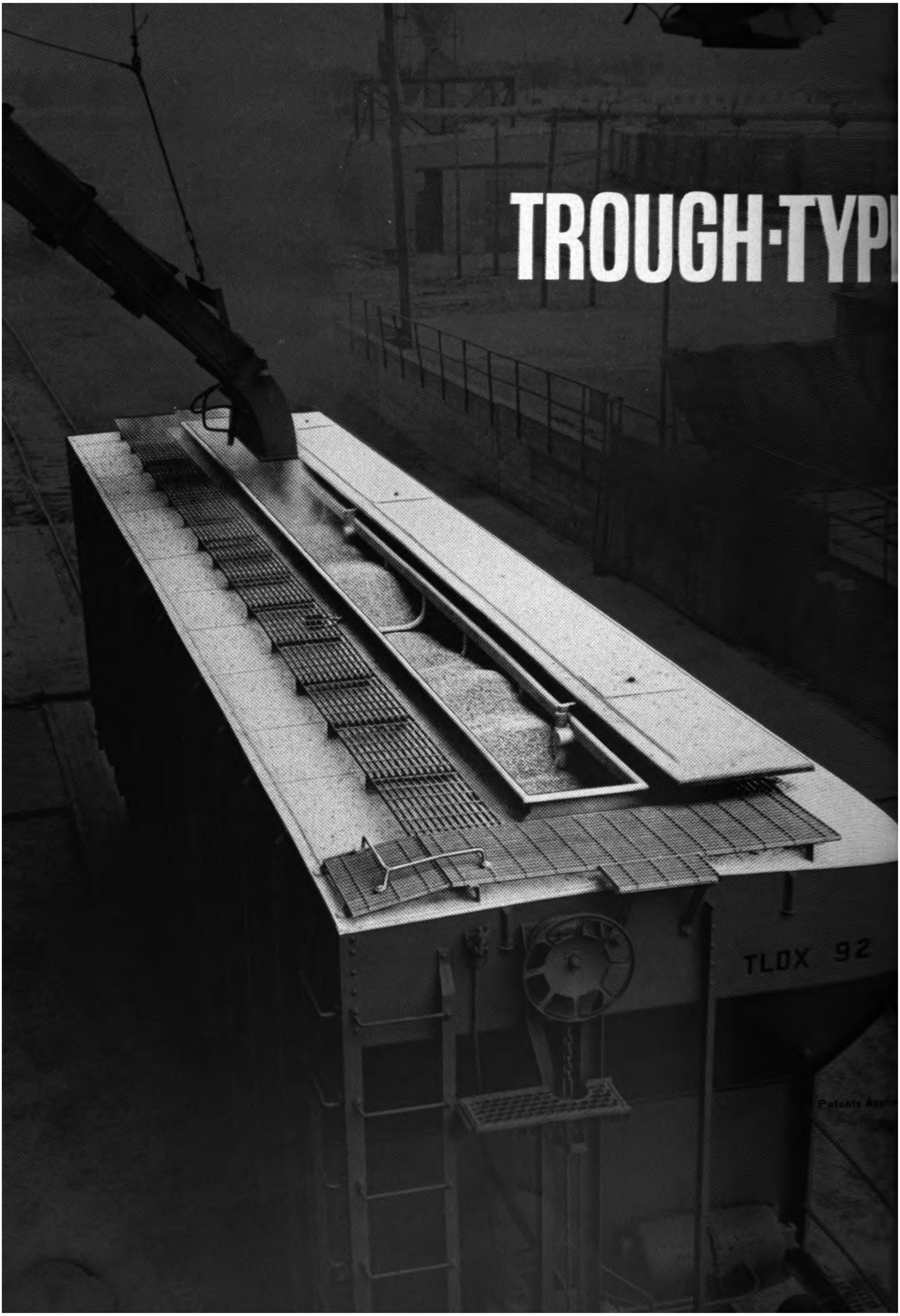
The schedule for the forthcoming meeting, with all sessions to be held at the Sherman House, is as follows:

June 25. Presentation of annual reports of General Committee and Committees on Locomotives and Locomotive Fuels and Lubricants, Wheels and Axles, Specifications for Materials, Safety Appliances, Brakes and Brake Equipment, Freight and Passenger Car Construction, Couplers and Draft Gears, and Journal Roller Bearings.

(Continued on page 11)



When this is a problem...


TROUGH-TYP
TLOX 92

NOTHER FIRST FROM PULLMAN-STANDARD

OADING HATCH

OR PS-2CD* COVERED HOPPER CARS

The Pullman-Standard trough-type loading hatch his year's *new look* in covered hopper car versa- ty. An alternate loading arrangement for the l-accepted PS-2CD Center Discharge Covered pper Car, the trough hatch promises to speed and plify bulk materials handling for a wide range of ned, manufactured and agricultural commodities.

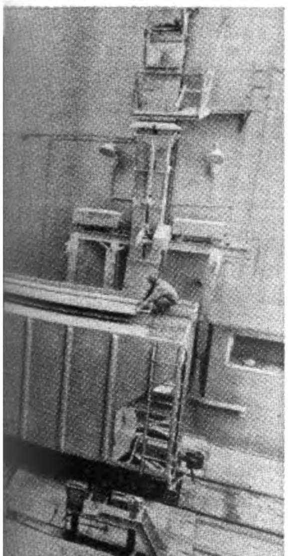
The 40′ x 2′ P-S trough hatch has been designed operating efficiency and mechanical depend- lity. For example, a high coaming and curved lip und the entire opening make a weather-tight, t-proof seal with one-piece gasketed hatch cover. tch opening and closing are handled from safe run- g board areas . . . no work at roof edge is required. d, recessed roof carlines and hopper dividers al- insertion of loading spouts below the hatch ming to preclude spillage and wind loss.

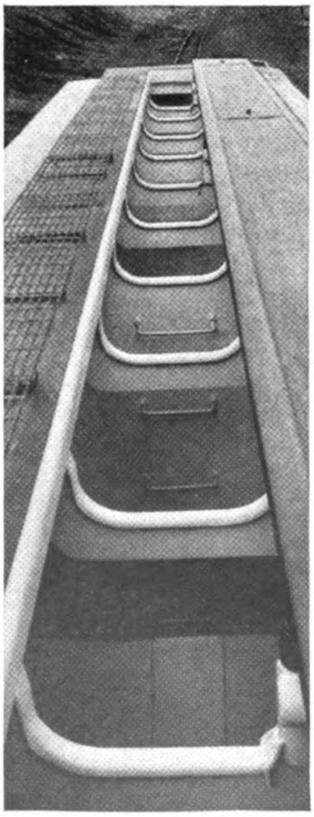
The trough hatch cover is mounted on three pivot arms equipped with sealed roller bearings. Three operating levers lock and seal the cover in place. Opening is a simple operation: the levers break the seal and lift the hatch cover clear of the coaming. The pivot arms then allow one man to easily slide the cover to its open position.

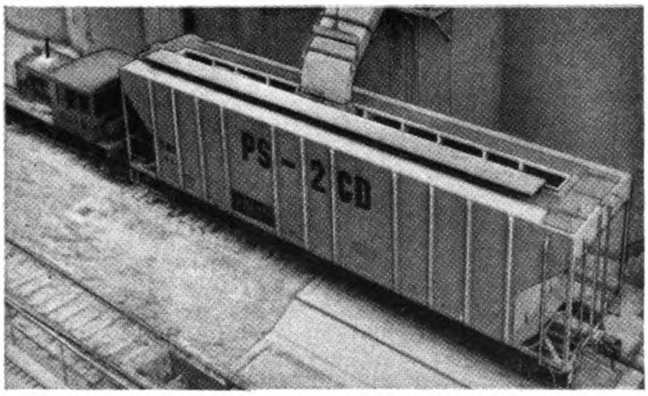
The new P-S trough-type loading hatch can be applied to all sizes of PS-2CD Covered Hopper Cars —2,600 cu. ft. to 4,500 cu. ft.—to provide railroads with new versatility in covered hopper car ownership and shippers with new economy in bulk material handling and transportation. Whatever your needs are, Pullman-Standard has the design, the alternates, the research-minded know-how to fill your covered hopper car requirements. For additional details on the new Pullman-Standard trough-type loading hatch, contact your nearest P-S Sales Office or write George L. Green, Vice President—Marketing.

essed carlines and hopper di- ers along the 40′ x 2′ trough ch opening add to loading effi- ncy, let the PS-2CD Covered pper fill without interruption.

e man can easily open and se the Pullman-Standard ugh hatch. And, he works ely on running board areas not at roof edge.







Center discharge unloading outlets and trough-type loading hatch make the PS-2CD Covered Hopper the ideal vehicle for handling grain, soda, ash, coke breeze and many other dry bulk products.

Three operating levers on the car roof move through an 180° arc to raise or lock the trough hatch cover. After it is raised, one man can easily slide the cover to the open position.

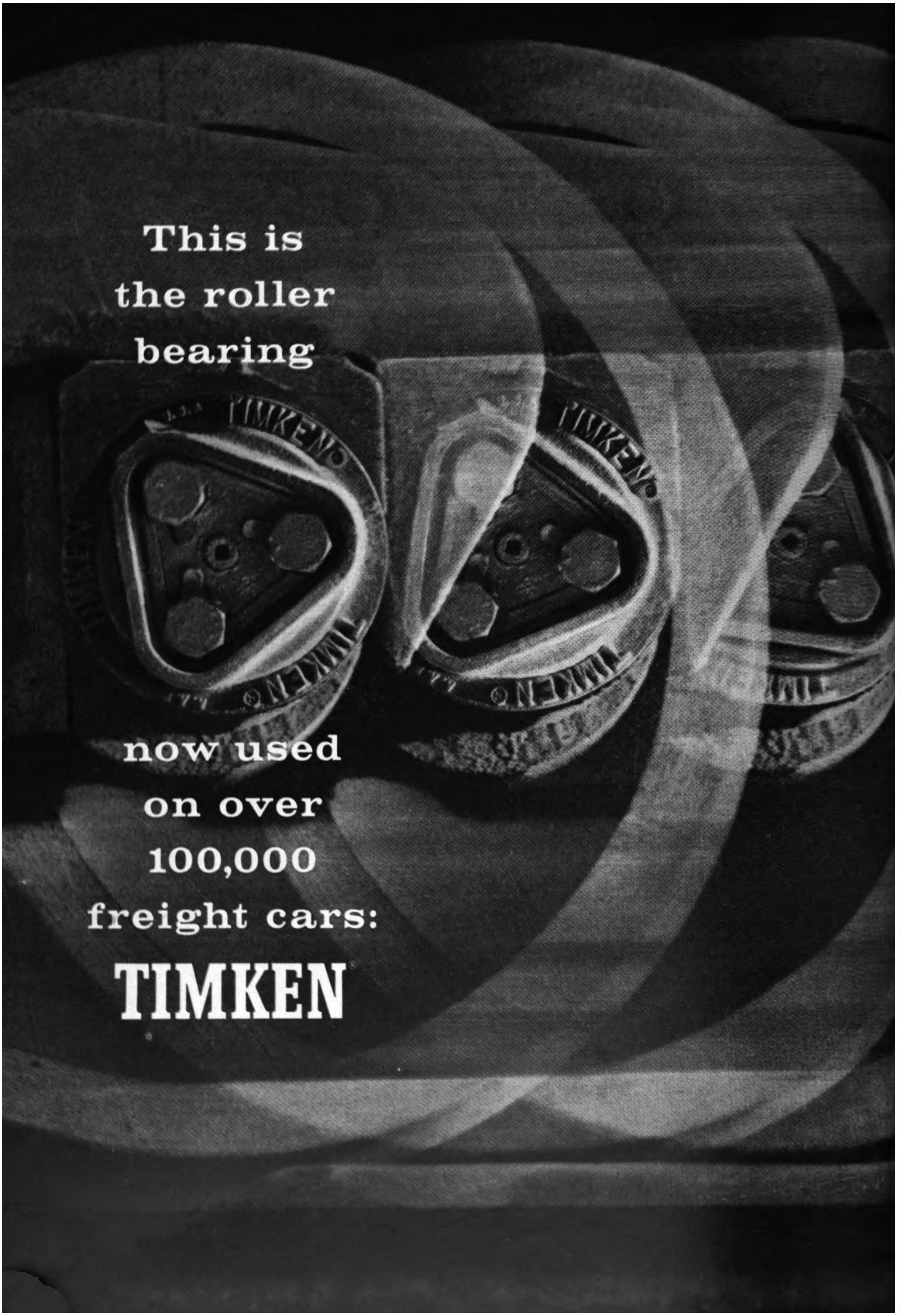
rademark of Pullman Incorporated

Patents Applied For

PULLMAN-STANDARD

A DIVISION OF PULLMAN INCORPORATED • 200 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO • J. C. FENNELLY CO., REPRESENTATIVE


This is
the roller
bearing
now used
on over
100,000
freight cars:
TIMKEN

Report

(Continued from page 5)

June 26. Presentation of annual reports of Committees on Arbitration, Prices for Labor and Materials, Electrical Equipment-Rolling Stock, Loading Rules, Tank Cars, and Lubrication of Cars and Locomotives.

Proceedings of the 1962 Annual Meeting of the Mechanical Division will be available in the near future at $12 per copy to member roads and non-members. There will be no free distribution. Only a limited number of copies are being printed.

Cushioned Cars Called Safe by ICC Examiner

Cars having long-travel sliding center sills have been found to meet the requirements of the Safety Appliance Acts by an ICC examiner. While the original action dealt with the design of one manufacturer, the findings probably would be applicable to all cushion-underframe cars, thousands of which are now in service.

The ICC has received from Examiner R. Boyd a proposed report recommending a Commission finding that the Hydroframe-60 freight car, built by Pullman-Standard and in service on several railroads, is not in violation of the Safety Appliance Acts or standards, "or of any other law, rule or regulation." From such a finding, the examiner also recommends that the Commission follow through and deny the petition assailing the car which was filed by unions representing railroad employees.

Meanwhile, the proposed report does note that the Commission rule with respect to safety appliances on new-type cars has been in effect since 1911. In that connection, Examiner Boyd goes on to express his agreement with the unions' suggestion that it may be time for a change. Accordingly, he recommends that the unions, or any other interested parties, file a petition asking the Commission to institute a rule-making proceeding "for the purpose of bringing the 1911 standards up to date and for the further purpose of supplementing them in any respects in which experience has indicated them to be inadequate."

Petitioners still active in the present case (No. 33746) are the Brotherhood of Railroad Trainmen, Order of Railway Conductors & Brakemen, and Switchmen's Union of North American. The Brotherhood of Railway Carmen of America was with them at the outset, but withdrew before the time came for presenting evidence.

The petition, filed April 27, 1961, resulted in the investigation out of which Examiner Boyd's report has come. Meanwhile, the Commission denied that plea of the petition which sought an immediate order prohibiting use of Hydroframe-60 cars. Among other allegations, the petition charges violations of coupler, grab-iron and end-of-running-board rules.

Hydroframe-60 is a cushion underframe car. In contrast to the conventional car's rigid center-sill construction, Hydroframe-60 has a sliding center sill giving 30 in. of cushioned sill travel in either direction. This dissipates the force of impacts and thus reduces damage to lading.

Generally, the petitioning unions contend that various features of the design, especially the greater-than-conventional distance between cars coupled together, make Hydroframe-60 unsafe. In addition to his recommendation that there was no violation of the safety laws or regulations, Examiner Boyd also advises the Commission that Hydroframe-60 "is not shown to be an unsafe or undesirable car in any other respect sufficient to justify any action or recommendation unfavorable to the car."

Considerable attention is given in the proposed report to the alleged violation of the end-of-running-board rule. There the examiner points out that an interpretation of that rule, which might well be relied on to clear Hydroframe-60, was issued by the Commission's Bureau of Safety in 1940 to clear such cars as those equipped with Duryea underframes.

"This," the proposed report says, "was a crucial turning point in the development of extended-center-sill cars, and the ruling in effect abandoned the previous intent of the requirement aimed at keeping the ends of adjacent running boards within easy stepping distance apart. Therefore, we have here the situation where the petitioners, on the one hand, insist that longitudinal running boards should be within stepping distance apart, but, on the other hand, [there is] a well-intended bureau ruling in unchallenged existence, until now, for over 20 years to the effect that there is no limitation upon the maximum distance between the ends of longitudinal running boards."

When he came to his determination that the end-of-running-board rule should not bar clearance of Hydroframe-60 as safe, however, Examiner Boyd did not rely on the challenged bureau ruling. He found the clearance in line with the "real intent and true scope of the 1911 standards." His reading of the record on which those standards are based convinced him that the Commission "fully intended to encourage flexibility for growth in the industry and among car makers . . . and to avoid inserting anything in the standards which would deter progress or discourage new ideas or inventions." Noting next that "there was even some discussion of rail-car inventions then in process which would be affected by the proposals," the proposed report adds:

"The whole purpose of the standards was affirmative in nature designed to prescribe minimum, uniform, and standardized safety appliances. The approach, being affirmative not negative, was to adopt standards suitable for all situations, within reason, and it was nowhere remotely contemplated that a negative approach should be used so as to negate the development and use of an improved car. In other words, it is clear that, had the Hydroframe-60 car then been envisioned, an approach designed to that car would have been used. Not envisioning that car, they issued no end-of-running-board rule intended for it.

"That the running-board problem was not overriding is apparent from the number of standards laid down for various types of cars having no running board and requiring none. When it was impossible from the inherent design of the car to require a running board, much less to lay down requirements with respect thereto, none was required, and the running board situation then was not even pressed as a problem. In no

instance was a particular type of car disfavored, or ordered for modification to fit the generally envisioned requirements; instead, in each situation the appliances were adjusted to meet the particular type of car presented. This was the whole approach.

"The same situation applies to a significant extent here, as here we have a car obviously essential now in the industry and, inherently, it could not be constructed to meet the literal requirements of 1911. The ultimate answer, then, is that, having never intended to preclude the development of the Hydroframe-60 car and having never intended the involved requirement to apply to such a car, the requirement has no validity, ab initio, except as to non-extended sill cars which were then in the contemplation of the Commission. In other words, the end-of-running-board rule has no validity as to the car here under consideration."

Meanwhile, the examiner had reviewed the evidence of interested railroads which indicates that it is unnecessary for trainmen to walk on the tops of trains. Among such railroads is the Southern, identified as a road which played a leading role, with Pullman-Standard, "in developing the 30-in. travel cushion underframe car. Southern has a "no-topping" rule which is "rigidly enforced."

While there is also evidence as to fatalities and injuries suffered by trainmen in their "relatively dangerous" work, such evidence also indicates that Hydroframe-60 is as safe, if not safer, than other cars. As to that, the proposed report says:

"The Hydroframe-60 cushioning particularly reduces chances of personal injuries from shifts of lading, and it also reduces the effect of shocks, jolts, bumps, or jerks, from whatever cause, upon persons on or in the car. To some extent, the Hydroframe-60 car means fewer cars with structural or appliance defects, and this contributes, in turn, to personal safety because many personal injuries and railroad accidents stem in the beginning from cars which are defective in such a way as to cause an accident."

The proposed report was served on interested parties May 7, with exceptions to be filed within 30 days from that date.

Brake Components Receive Mechanical Division Attention

Cleaning, installation and modification of air-brake components have recently been the subjects of AAR Mechanical Division advisory letters. Ultrasonic cleaning, application of brake-cylinder release valves, and modification of angle and cut-out cock keys all have been subjected to restrictions.

When ultrasonic cleaning systems are used in the maintenance of air-brake equipment for interchange cars, the Division has advised member roads and private car owners of the following procedures:

- Bushed bodies must not be cleaned in an ultrasonic bath;
- Piston assemblies must be completely disassembled for cleaning, including removal of rings and wicks;
- In cleaning ferrous metals, sufficient rust inhibitor must be included in the solution to prevent rusting until more permanent protection can be applied.

Bending of the ends of its release rods into ½-in. diameter loops will henceforth make it unnecessary to stencil a freight car with the diamond emblems which previously have indicated that it is fitted with a brake-cylinder release valve.

Separate release rods may be used to operate the reservoir duplex release valve and the brake-cylinder release valve, or a single rod may be connected to operate both valves simultaneously. Any release rod operating the brake-cylinder release valve, either separate from, or common with, the reservoir duplex release-valve release rod, must have the handle on both sides of the car bent in a closed loop having a center opening ½ in. in diameter. It must be supported and so guided close to the control valve as to prevent operation of the brake-cylinder release valve due to inertia forces parallel to the center sill of the ca[r] release rods having closed loop [on] sides of the car will adequately identi[fy] application and availability of the cylinder release valve, and no other ling or marking will be required.

No change will be required on ca[rs] or in service until such time as th[ey] be given repairs or shop attention make replacement of operating rods ble without undue hardship. The p[...] standard diamond stencil indicating cation of the operating rod to a brake der release valve must be maintained cars not having the closed loop ide[ntifica]tion.

The Mechanical Division has also a[...]

(Continued on page 58)

Orders and Inquiries for New Equipment

Placed Since Closing of May Issue

Locomotive Orders

GULF, MOBILE & OHIO.—*EMD:* 11 GP-30 diesel-electric locomotives. Cost, approximately $2,250,000.

Freight Car Orders

BANGOR & AROOSTOOK.—*Merchants Despatch:* 100 RS-type refrigerator cars. On lease. Cars to be repaired and painted at BAR shops and available to Maine potato shippers in the fall.

CENTRAL OF GEORGIA.—*Unspecified buirders:* 200 50-ft, 70-ton cushion underframe box cars; 370 50-ton, 60½-ft box cars with 9-ft doors.

CHESAPEAKE & OHIO.—*ACF:* 155 100-ton Center-Flow covered hopper cars. For August-September delivery. *General American:* 150 70-ton, 2,600-cu-ft-capacity Airslide covered hopper cars.

CHICAGO & NORTH WESTERN.—*North American Car:* 100 63-ft, 70-ton, mechanical reefers, with 50-ft long loading space. On lease. To be delivered in mid-summer.

CHICAGO GREAT WESTERN.—*ACF:* 3 55-ton flat cars. Delivered.

FRISCO.—*General Steel Industries:* 50 53½-ft, 70-ton bulkhead flat cars equipped with one-piece, cast steel underframes and laterally adjustable tie-down equipment. Cost, $861,000. For third quarter delivery. *Pullman-Standard:* 25 60-ft, 70-ton Hydroframe-60 cushion underframe box cars equipped with roller bearings. Cost, approximately $500,000. For August delivery.

GREAT NORTHERN.—*Pacific Car & Fdry:* 100 50-ft, 70-ton, 4,000-cu-ft capacity mechanical refrigerator cars equipped with load divider bulkheads, aluminum floor racks, cushion underframes, and roller bearings. Cars for Western Fruit Express, a GN subsidiary. Delivery to begin early in fourth quarter this year.

GULF, MOBILE & OHIO.—*Pullman-Standard:* 200 50½-ft, 70-ton Hydroframe-60 cushion underframe box cars. Cost, approximately $2,700,000.

ILLINOIS CENTRAL.—*Bethlehem Steel:* 200 53½-ft, 50-ton bulkhead flat cars. Cost, $2.3 million. 171 cars being delivered; remaining 29 cars, to be equipped with tie-down chains and load binders for lumber, for August delivery.

KANSAS CITY SOUTHERN.—*Pullman-Standard:* 100 90-ton, 4,000-cu-ft-capacity covered hopper cars; 100 90-ton box cars; 14 70-ton PS-1 Hydroframe-60 box cars; 1 refrigerator car. For July delivery. *General American:* 10 70-ton, 2,600-cu ft Airslide covered hopper cars. For July delivery.

KATY.—*General American:* 50 cushion underframe box cars. *Pullman-Standard:* 50 cushion underframe box cars. Both orders on lease and for August delivery.

MISSOURI PACIFIC.—*Greenville Steel Car:* 100 60¾-ft box cars with 16-ft double doors, cushion underframes and roller bearings. Cost, nearly $2 million. For September delivery.

NEW YORK CENTRAL.—*Greenville Steel Car:* 100 50-ton flat cars. Cost, $1,270,000. Delivery begun.

NICKEL PLATE.—*General American:* 175 70-ton insulated box cars with movable bulkheads and adjustable side fillers; 150 70-ton box cars with nine-belt loading systems; 50 100-ton box cars with nine-belt loading systems. The 375 cars will be 50-ft in length with cushion underframes. *Greenville Steel Car:* 75 4,000-cu ft, 100-ton covered hopper cars, 25 to have interior linings and pneumatic unloading outlets. Delivery [...] orders to begin in October.

PITTSBURGH & LAKE ERIE.—*Despatch Sh[ops]:* [...] 70-ton box cars equipped for shock ab[sorption]. Cost, $4.35 million. Delivery to begin i[n Sep]tember.

SANTA FE.—*General American:* 50 70-ton [...] cu-ft-capacity Airslide covered hopper ca[rs]. [...] delivery this month. *Magor Car:* 100 53½-ft, [...] ton wallboard flat cars equipped with Shock [Con]trol underframes and roller bearings. For [...] August delivery.

SOO LINE.—*General American:* 60 50-ft, [...] insulated box cars equipped with hydraulic [cush]ion underframes, 10-ft plug doors and [...] protection devices; 15 Airslide covered h[opper] cars; 80 50½-ft, 70-ton box cars equipped [with] hydraulic cushion underframes, nailable [...] floors, 10-ft plug doors and lading devices. *Th[rall]:* 19 60-ft, 70-ton flat cars, equipped with [...] tie-down mechanisms for securing farm tr[...] *Ortner:* 30 50½-ft, 70-ton gondola cars. *Be[thle]hem Steel:* 10 85-ft, 70-ton flat cars. *Com[pany] shops:* 8 53½-ft, 70-ton flat cars. These 222 r[oller] bearing freight cars are part of previously-a[uthor]ized $7.5 million equipment program (RL[&C] Jan., p 8).

SOUTHERN.—*Pullman-Standard:* 100 60¾-ft [...] per-Cushion box cars. Cost, $2.3 million. Be[ing] delivered.

WABASH.—*Whitehead & Kales:* 10 89-ft, [...] flat cars. For New Jersey, Indiana & Illi[nois] Wabash subsidiary. Cars for delivery this m[...]

Notes and Inquiries

Central of Georgia $9-million equipment [pro]gram calls for purchase of 570 new freight [cars] (see order above) and five locomotives.

The *Southern Pacific* has ICC authorizati[on to] assume obligation and liability for $8.1 mi[llion] in 15-year equipment trust certificates [...] through competitive bidding. Funds from sa[le] [...] be used to finance approximately 80% of [the] cost of 13 2,500-hp diesel freight locomotives, [...] 70-ton flat cars; 114 100-ton insulated box ca[rs;] 88 100-ton box cars; 18 100-ton tank ca[rs;] [...] 100-ton non-insulated tank cars, and 15[...] ton all-steel covered hopper cars. Total estim[ated] cost, $10,128,632.

The *Port Authority Trans-Hudson Cor[p.]* [...] received proposals from Budd, St. Louis [...] Pullman-Standard, and Hitachi New York [...] the design and building of between 200 and [...] new rapid-transit cars for PATH's Hudson tu[bes.] PATH says the proposed designs will und[ergo] an intensive three-month-long technical eva[lua]tion by leading transit-system experts, ind[...] consultants and New York Port Authority te[ch]nicians. No contract will be awarded, howe[ver,] until there is a final court decision on the le[...] of PATH's acquisition of tubes formerly oper[ated] by the Hudson & Manhattan (RL&C, May, p [...]

New Facilities

The *Metropolitan Transit Authority of Bo[ston]* plans construction of a 100- x 300-ft shop [...] Dorchester, Mass., to service and repair the [...] new transit cars now going into service on [...] MTA's Cambridge-Dorchester line (RL&C, Ma[r.,] p 38). The project will permit abandonment [...] sale of MTA shop and yard at Harvard, the li[ne's] other terminal where the cars being repla[ced] have always been maintained.

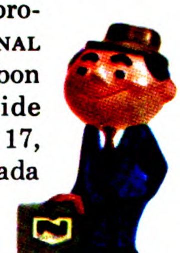
125 curves in 66 miles with grades up to 1.8% demand severe cycling of diesel power!

Lehigh Valley handles tough terrain and fast schedules with NATIONAL Brushes
TRADE-MARK

Between Buffalo and New York the Lehigh Valley maintains unsurpassed service despite stretches of track that push locomotive traction motor and main generator brushes to the utmost.

Miles of steep mountain grades—leading into one curve after another—heavy-tonnage trains, and frequent acceleration and deceleration combine to spell tough railroading for diesel equipment. Keeping on schedule through this rugged terrain calls for dragging and dynamic braking—in short sequence. Through long periods of severe cycling, NATIONAL brushes provide dependable commutation with minimum commutator maintenance.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.



Contact Mr. National Carbon

UNION CARBIDE

"National" and "Union Carbide" are registered trade-marks for products of

NATIONAL CARBON COMPANY

Railroading across the Rockies at 10,221 feet puts locomotives through a tough workout!

Denver & Rio Grande Western gets power for the peaks with NATIONAL Brushes
TRADE-MARK

The Rio Grande system daily operates heavy-tonnage freight trains east and west via the Moffat Tunnel and Royal Gorge routes—through the heart of the spectacular Colorado-Utah Rockies.

All the varied and rugged operating conditions common to mountain railroading are encountered in crossing the Continental Divide at two points—9,239 feet above sea level inside the Moffat Tunnel and 10,221 feet at Tennessee Pass.

Competitive schedules are maintained with remarkable regularity, assisted by the dependable performance of NATIONAL brushes. They provide top-quality commutation—with minimum commutator maintenance—over the entire system.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.

Contact Mr. National Carbon

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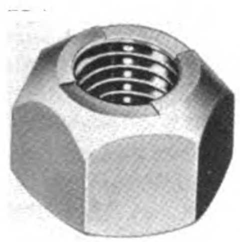
NATIONAL CARBON COMPANY

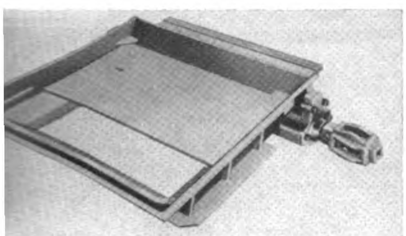
What's New in Equipment



k Nut

;uper Uni-Torque lock nut, an adapta- ɔf the Uni-Torque lock nut, locks in ›osition on the bolt by deflecting the ıreads of the nut out of their true helix at they take a firm grip on threads of ıating part. The sweeping chamfer of ›p of the nut makes it instantly identifi- either by sight or feel. The new nut, is to withstand severe vibration and shock and eliminate need for cotter pins, washers, or other auxiliary locking de- . It is available in sizes ¼ in. through , finished hexagon series, with national ;e and fine threads. MacLean-Fogg Nut Co.

›r more information circle 6-1 on card wing page 64.



;charge Gate

:, trouble-free, one-man use, under all ther conditions, is the feature of the 'er geared discharge gate for 8 and 11 ail clearance. A hypocycloid gear, oper- g on an eccentric crankshaft, produces 1 gear reduction which is said to deliver ;e times the opening power at the gate r conventional direct drives. The gates e fewer castings, and are shipped fully ;mbled, ready to weld to chute. Pinions welded to the shaft for true alignment. : gate, which has an opening of 13 x 24 can be pulled out for cleaning. Wine lway Appliance Co.

'or more information circle 6-2 on card lowing page 64.

'heel Truing Inserts

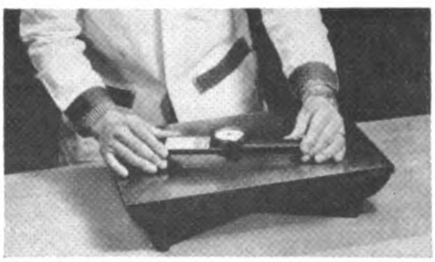
e WTS-10P wheel truing inserts for full- ıtour milling machines have a 7½-deg ief angle for proper clearance and mini- ım tool pressure. They are available from ›ck in Grade K4H and have prehoned tting edges for greater resistance to chip- ıg when milling work-hardened steel surfaces. As only a small arc of each insert is in contact with the wheel during the machining operation, they can be indexed a number of times, depending upon the depth of cut. Square shank hex or socket head screws with nuts provide easy indexing of the inserts in the cutter body. Kennametal, Inc.

For more information circle 6-3 on card following page 64.

Oil Spill Control Unit

The Magnus Chem-Cart is a mobile unit designed to eliminate pollution problems caused by oil and chemical spills. It carries a 150-gal tank for holding the oil-dispersing chemical solution; pump, hose and spray nozzle for applying the chemical to the spill; pump intake hose and discharge hose for applying high-pressure stream of water to emulsify and disperse the oil. Provision is also made for pumping the dispersing chemical from nearby drums when needed to combat large spills. The unit is available either with wheels and hitch, or on skids. When fully loaded, it can be moved by two men. Magnus Chemical Co.

For more information circle 6-4 on card following page 64.



Flatness Gauge

The Lapmaster precision flatness gauge makes direct-reading flatness measurements in decimals on a full jewel-movement dial indicator. If desired, these readings can be changed to light bands using the conversion table affixed to the gauge. The gauge is said to be especially suited to checking large parts when an optical flat is not available, or for checking non-reflective surfaces. It is furnished complete with a hardened season-treated-steel master calibration flat, lapped to within .000010 in. Crane Packing Co.

For more information circle 6-5 on card following page 64.

Diesel Battery

Better starting ability and an initial capacity of at least 14% more than other batteries are said to feature the MS Exide-Ironclad diesel locomotive battery. Full cranking power is available at least 25% longer than other batteries having comparable 8-hr discharge rating, even in freezing temperatures. The tubes of the positive plates are square-shaped, and the tubing is more highly porous. Electrical sizes are 280 and 420 amp-hr, both at the 8-hr rate with electrolyte specific gravity of 1.250 at 77 deg F. At the 1½-min cranking rate at 32 deg F, the MS-280 will deliver 900 amp; the MS-420, some 1,350 amp. Electric Storage Battery Co.

For more information circle 6-6 on card following page 64.

Bolted Bulkheads

A bulkhead made of aluminum extrusions framed in steel and bolted rather than welded is now included among the Evans one-piece DF damage-prevention devices. Each section of the bulkhead is an extruded beam of tongue-and-groove construction. In case of damage, any one of the aluminum sections can be replaced by unbolting the steel outer frame. Each bulkhead is operated by one man by means of a single lever. Evans Products Co.

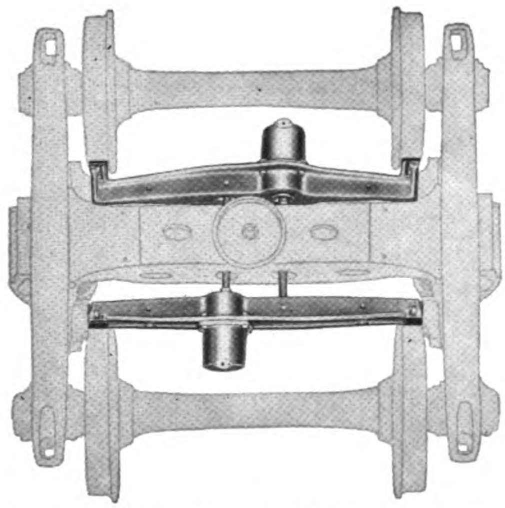
For more information circle 6-7 on card following page 64.

Aluminum Cleaner

Trailer-Glo, a non-viscous, one application aluminum cleaner and brightener, is a combination of acid-type detergents and wetting agent. It goes into solution without predissolving and mixing, and cuts through diesel exhaust stains and dulling films caused by weathering, also flushing off heavy road soils. For vehicles regularly washed it can be diluted from 1:9 to 1:19 with water; for corroded aluminum sur-

(Continued on page 22)

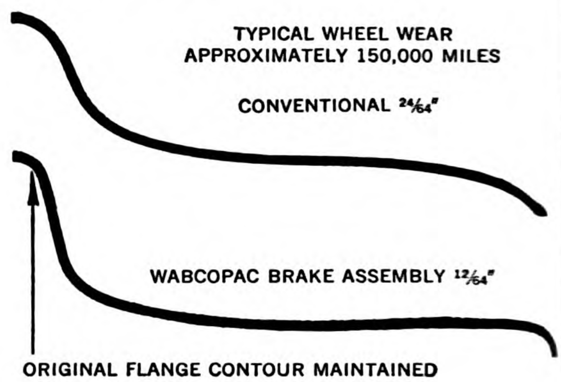
WABCOPAC® Brake Assembly



Simplicity of the WABCOPAC Brake Assembly—direct action of brake cylinders eliminates inefficient power transmission which occurs with conventional brake rigging. It delivers the maximum force to the COBRA* Composition Shoes in contact with the wheels. The WABCOPAC Brake Assembly eliminates the following conventional rigging components: body mounted cylinders, cylinder levers, slack adjuster, support brackets, rods, truck levers and beams.

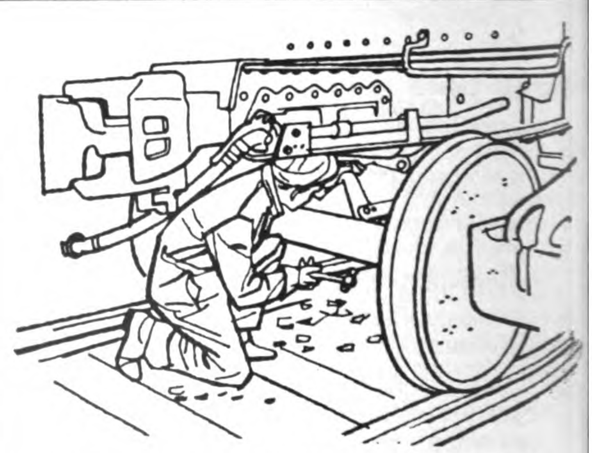
*Registered Trademark of Railroad Friction Products Corporation

Uniform shoe and wheel wear—direct acting brake cylinders of the WABCOPAC Brake Assembly provide uniform shoe force on all wheels. This produces even shoe and wheel wear with correspondingly longer wheel and shoe life. The wheel profiles below are typical and were taken from single-wear wheels after 150,000 miles of service. The lower profile is taken from a car equipped with WABCOPAC Brake Assembly and COBRA Shoes; note light tread wear and original flange contour maintained. The upper profile was taken from a car with cast iron shoes and conventional rigging. Wheel tread wear is doubled and a sharp vertical flange developed.



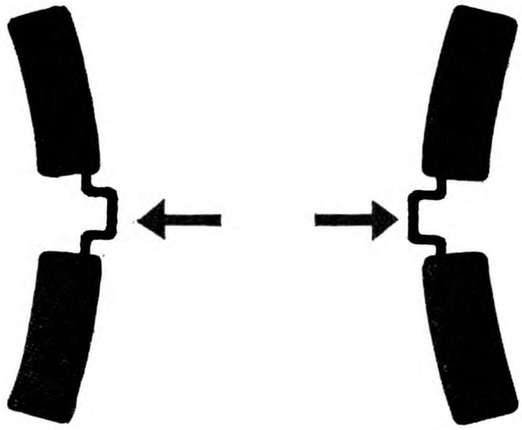
COMPARATIVE WEIGHTS	CONVENTIONAL RIGGING	WABCOPAC BRAKE ASSEMBLY
50 OR 70 TON BOX OR REEFER	1500 lbs.	1280 lbs.
70 TON PIGGYBACK	1900 lbs.	1310 lbs.
90 TON HOPPER	1950 lbs.	1320 lbs.
100 TON ORE E-L CLASP	3200 lbs.	1380 lbs.

Cuts dead weight up to 1800 lbs. per car. Replace conventional rigging with WABCOPAC Brake Assembly and convert the cost of hauling dead weight to increased payload. The WABCOPAC Brake Assembly can reduce dead weight 200 to 1800 pounds per car, depending on car design. This can be translated into savings of up to $90 per year.



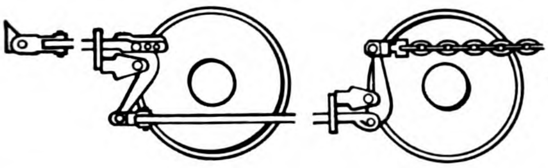
Elimination of the slack adjuster, either manual or automatic is a big step forward toward reduced maintenance. The WABCOPAC Brake Assembly needs no piston travel adjustment for the life of one-wear wheels. When multiple-wear wheels are used, piston travel adjustment is made only at the time of wheel turning.

owers transportation costs



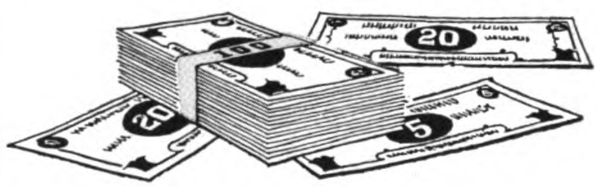
The WABCOPAC Brake Assembly is more efficient than conventional brake rigging because of direct application of brake cylinder force to brake shoes. The WABCOPAC Brake Assembly is 80-85% efficient as compared to conventional rigging efficiency of 50-65%. The force delivered at the different shoe locations on a given car varies only 10% with WABCOPAC Brake Assembly, whereas this variation with conventional rigging is generally 40%.

The hand brake with WABCOPAC Brake Assembly is more effective for the important condition—the loaded car. Due to the characteristics of the COBRA Shoe, hand brakes are required on only one truck. By doubling the shoe force on one truck, better hand brake holding power is obtained over that now available with cars equipped with conventional rigging and metal shoes.



Savings on original installation

1. Low installation cost (Fewer brackets, levers, rods to fabricate & assemble)
2. No clasp brake required (Savings up to $400 per car)
3. No slack adjuster required
4. Single shoe per wheel



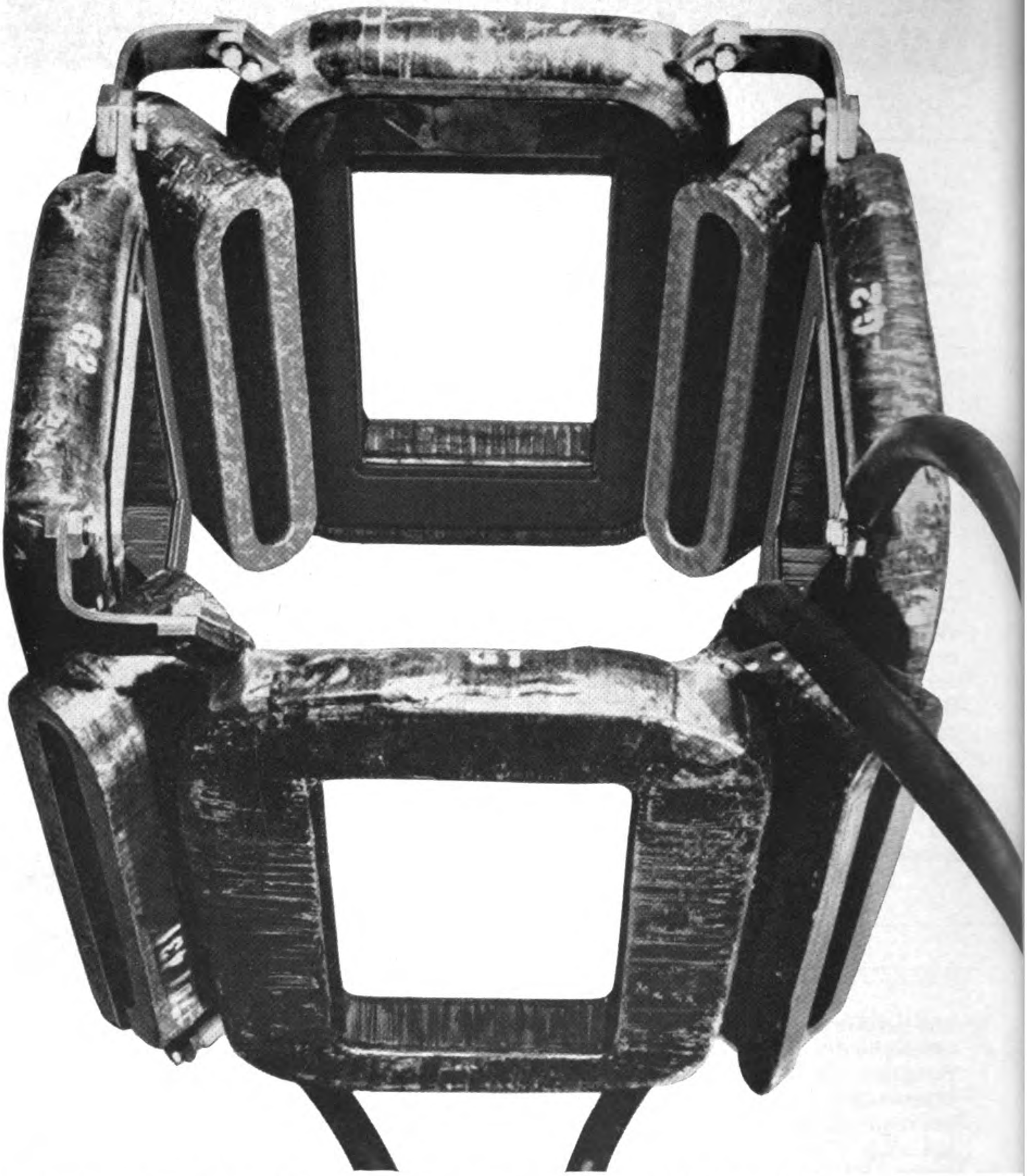
PLUS

Operating savings up to $145 per car per year

1. COBRA Shoes last from 2-4 times longer than metal shoes
2. Wheels will operate 50-100% longer
3. Estimated savings in dead weight haulage up to $90 per year

WABCO WESTINGHOUSE AIR BRAKE DIVISION

WILMERDING, PA. / Westinghouse Air Brake Company



OVER

~~6500~~

~~15,000~~

~~19,000~~

26,000

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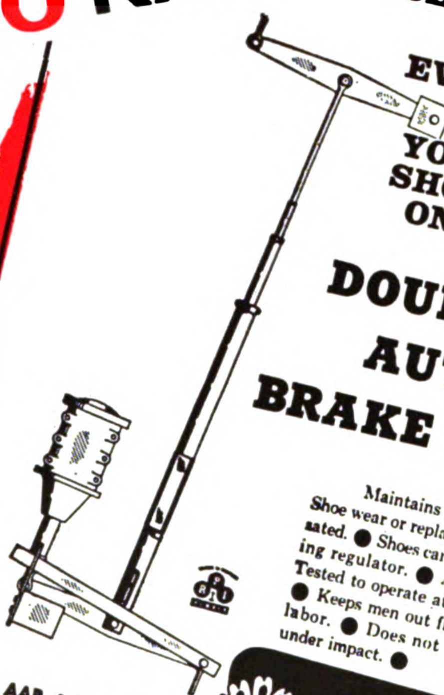
ON 50 RAILROADS

CLASS I RAILROADS USE IT

EVERY RAILROAD NEEDS IT

YOUR RAILROAD SHOULD HAVE IT ON EVERY CAR



DOUBLE ACTING AUTOMATIC BRAKE REGULATOR

Maintains piston travel at all times. ● Shoe wear or replacement is instantly compensated. ● Shoes can be replaced without touching regulator. ● All steel construction. ● Tested to operate at 100 p.s.i. on 12" cylinder. ● Keeps men out from under cars. ● Saves labor. ● Does not cycle. ● Will not slip under impact. ●

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MODEL 1340

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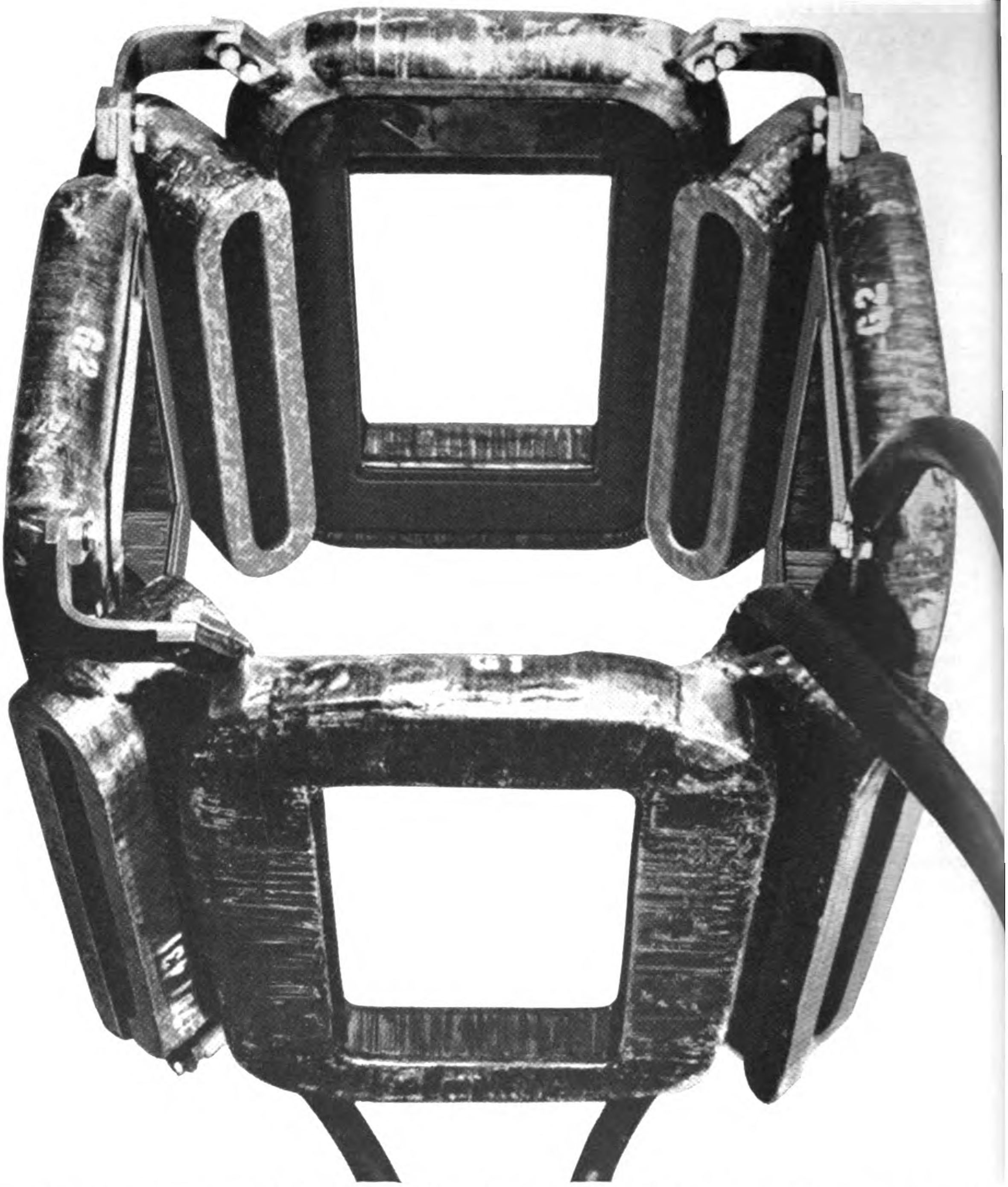

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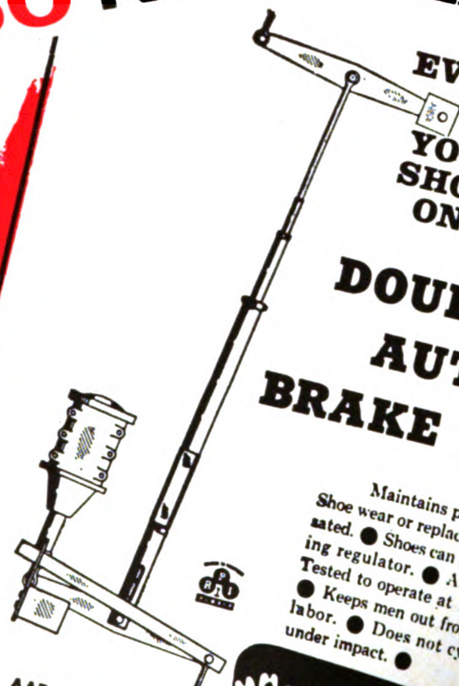
NOW IN SERVICE
ON 50 RAILROADS

CLASS I RAILROADS USE IT
EVERY RAILROAD NEEDS IT
YOUR RAILROAD SHOULD HAVE IT ON EVERY CAR



DOUBLE ACTING AUTOMATIC BRAKE REGULATOR

Maintains piston travel at all times. ● Shoe wear or replacement is instantly compensated. ● Shoes can be replaced without touching regulator. ● All steel construction. ● Tested to operate at 100 p.s.i. on 12" cylinder. ● Keeps men out from under cars. ● Saves labor. ● Does not cycle. ● Will not slip under impact. ●

AAR APPROVED
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H&L PEACOCK
BRAKE REGULATOR
MODEL 1340

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The railroads asked for

RESERVE

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- CUSHION SHOCKS
- CUT COSTLY DAMAGE CLAIMS
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- REDUCE MAINTENANCE COSTS

CAPACITY

Cardwell Westinghouse was FIRST to meet Specification M901E-59!

Continually, Cardwell Westinghouse is working with the railroads to help reduce damage claims and maintenance costs.

The Westinghouse MARK 50 Friction Draft Gear was the first to meet A.A.R. Specification M901E-59, calling for a high capacity, low reaction Gear for 24⅝-inch pockets. The railroads wanted adequate capacity to cushion critical shipments. MARK 50 with 3¼ inches of travel, provides capacity over and above the A.A.R. requirements.

Let this high capacity Gear cushion and protect *your* cars and ladings against high-energy impacts. Specify MARK 50!

WESTINGHOUSE

MARK 50

FRICTION DRAFT GEAR FOR STANDARD 24 ⅝-INCH POCKETS

CARDWELL WESTINGHOUSE

Company

332 S. Michigan Ave., Chicago 4, Illinois

Canadian Cardwell Co., Ltd., Montreal 2, Quebec

What's New

(Continued from page 15)

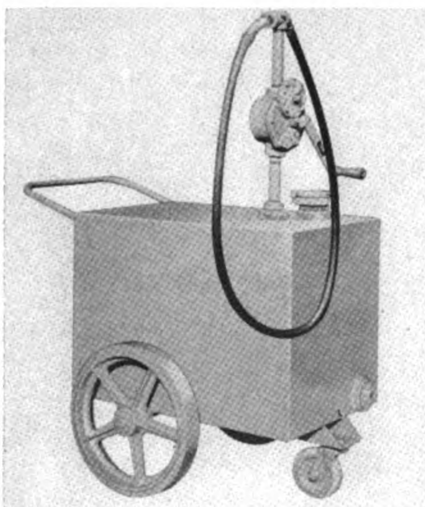
faces, 1: to 1:5. Wyandotte Chemicals Corp.

For more information circle 6-8 on card following page 64.

Reducing Locknuts

Reducing Locknuts centralize conduit in knockout whenever the size of conduit is reduced. The multi-fluted edge has many notches for quick adjustment. When the nut is tight, a perfect bond between box and conduit is said to result. Each reducing locknut is blanked from high quality-steel, accurately threaded and cadmium plated. Railroad car controls are among the applications for which they are suited. R. H. Green, Inc.

For more information circle 6-9 on card following page 64.



Portable Tank

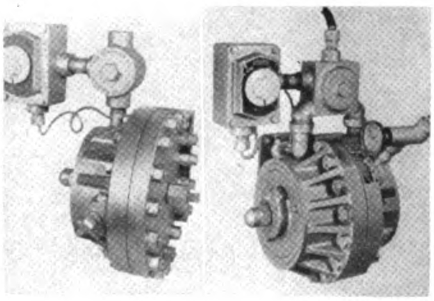
The Model L-100 portable 65-gal wheeled tank is designed to transport new or filtered liquids from storage tank or filter to machinery and used liquid to reclaiming or filtering unit. The 12-gal steel unit is mounted on two 18-in. solid rubber tires and a guide wheel. A reverse suction vane-type rotary pump draws liquid in the tank when the crank handle is turned to the left, and discharges while turning the handle to the right. Vertical stroke measuring pumps and power-driven pumps are available. A fine mesh inverted cone-style hose strainer is supplied with 8-ft of 1-in. hose. A second strainer is attached to the extreme end of the suction pipe. Systems Engineering & Sales Co.

For more information circle 6-10 on card following page 64.

Structural Fasteners

Railway cars, bridges, and other structures, it is said, can be designed using the C50L hi-tensile Huckbolt fasteners with the same allowable stresses used with ASTM-A325 high-strength bolts. Fastener diameters are ¼, ⅝, ¾, ⅞ and 1 in. Installation is an automatic process using a 5,000-psi hydraulic tool that permanently swages a metal collar into the fastener's locking grooves while the fastener is under tension. Huck Manufacturing Co.

For more information circle 6-11 on card following page 64.



Paint Heater

Uniform temperature and viscosity control, it is said, can be had with the Series 450 and 902 high-pressure paint heater which can be installed in the high-pressure line of an airless system for operation up to 3,000 psi. It may be used for paint and heavy bodied coatings. The heaters are equipped with an external dial controller which is adjustable while the equipment is operating. They are of aluminum construction and have a power range of 1.5 to 4 kw. Spee-Flo Co.

For more information circle 6-12 on card following page 64.

Belt Sanders

The B2 3-in. belt sander is for use wherever heavy-duty sanding must be fast, uniform, and without ripples. It has a ¾-hp motor and a quick-change lever-ac[...] changer. Idle belt speed is 1,3[...] loaded speed, 1,060 sfpm. With the [...]ception of a 1-hp motor and a 4-in. bel[...] B4 sander is the same as the B3 [...] can be equipped with a vacuum d[...]lector system. Abrasive belts of 4[...] and 120 grit are a standard equipment[...] tors are universal a-c d-c, 25/60 cy[...] either 115 or 230 volt. Ingersoll-Ra[...]

For more information circle 6-13 on [...] following page 64.

Plating Process

Vanderlube is an extension of the [...] Krome plating process designed for [...] faces of equipment on which conven[...] lubricants cannot be used. It cons[...] filling the crevices in a Porus-Krome p[...] surface with a self-lubricating fluoro[...] resin to create an effective dry smea[...] tween metal-to-metal sliding surfaces[...] cylinder bore, plated with Porus-Krome[...] then Vanderlubed, is said to have a[...] tremely hard surface and a low coeffic[...] friction, lasting three to five times [...] than a conventional cast-iron cylinder [...]face. Van der Horst Corp. of America.

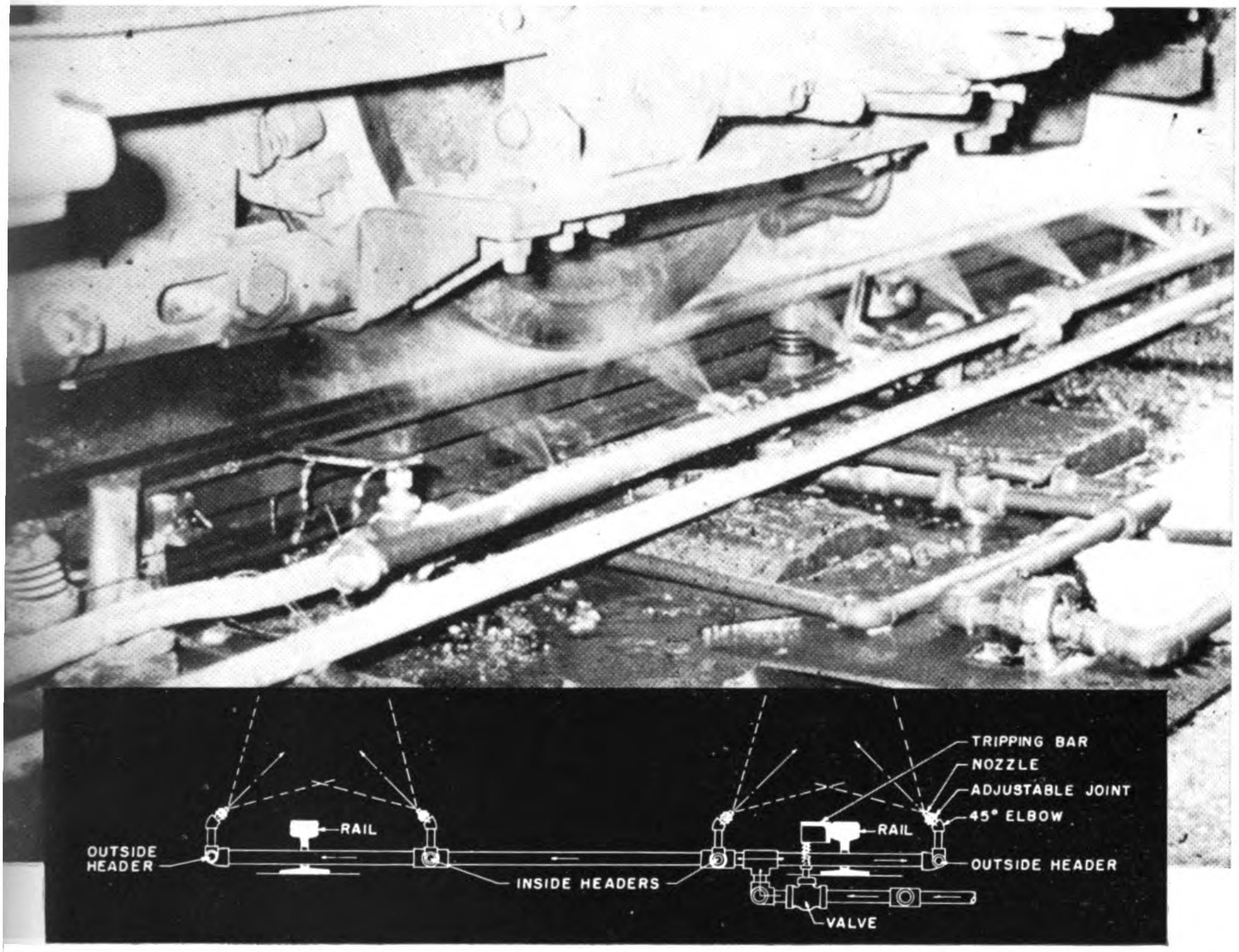
For more information circle 6-14 on [...] following page 64.

Measuring Instrument

Ferrous parts and materials are meas[...] and sorted according to hardness, [...] treat, alloy content, and metallurgical str[...]ture with the Magnatest ED-300 eddy [...]rent instrument. Its flow frequency of [...] cps gives a maximum eddy current pe[...]tration of approximately ⅛ in. to ign[...] superficial surface conditions. Lift-off [...]justment compensates for surface rough[...] to permit accurate reproducible readi[...] through rust, dirt, or scale. The heavy-ga[...] aluminum cabinet accommodates an [...]tional plug-in electronic gate for "go" [...] "no go" operation. On the rear panel [...] the gate are control contacts for vari[...] read-out, sorting and alarm systems. E[...] instrument is equipped with a 2½ in. [...] x ¾-in. diameter general purpose sens[...] probe with a ¼-in. replaceable harde[...] steel ball tip. Operation is from a 115-v[...] 60-cycle, a-c line. Magnaflux Corp.

For more information circle 6-15 on [...] following page 64.

Oakite adds more POWER to your MANPOWER



...simple setup cleans diesel wheels automatically

This Oakite automatic wheel-cleaning system makes things a lot easier for your clean-up crew—relieves them of tedious, time-consuming work. Charged with a solution of Oakite 120, it automatically removes oily, sticky soil and road dirt . . . leaves wheels completely clean for quick inspection. This modern Oakite mechanized method is bound to show a net savings for your road.

By boosting the cleaning power of your available manpower, Oakite materials and methods like these give you the *important* advantage: LOW-COST END RESULTS. Ask the Oakite man for engineering drawings and details. Or write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

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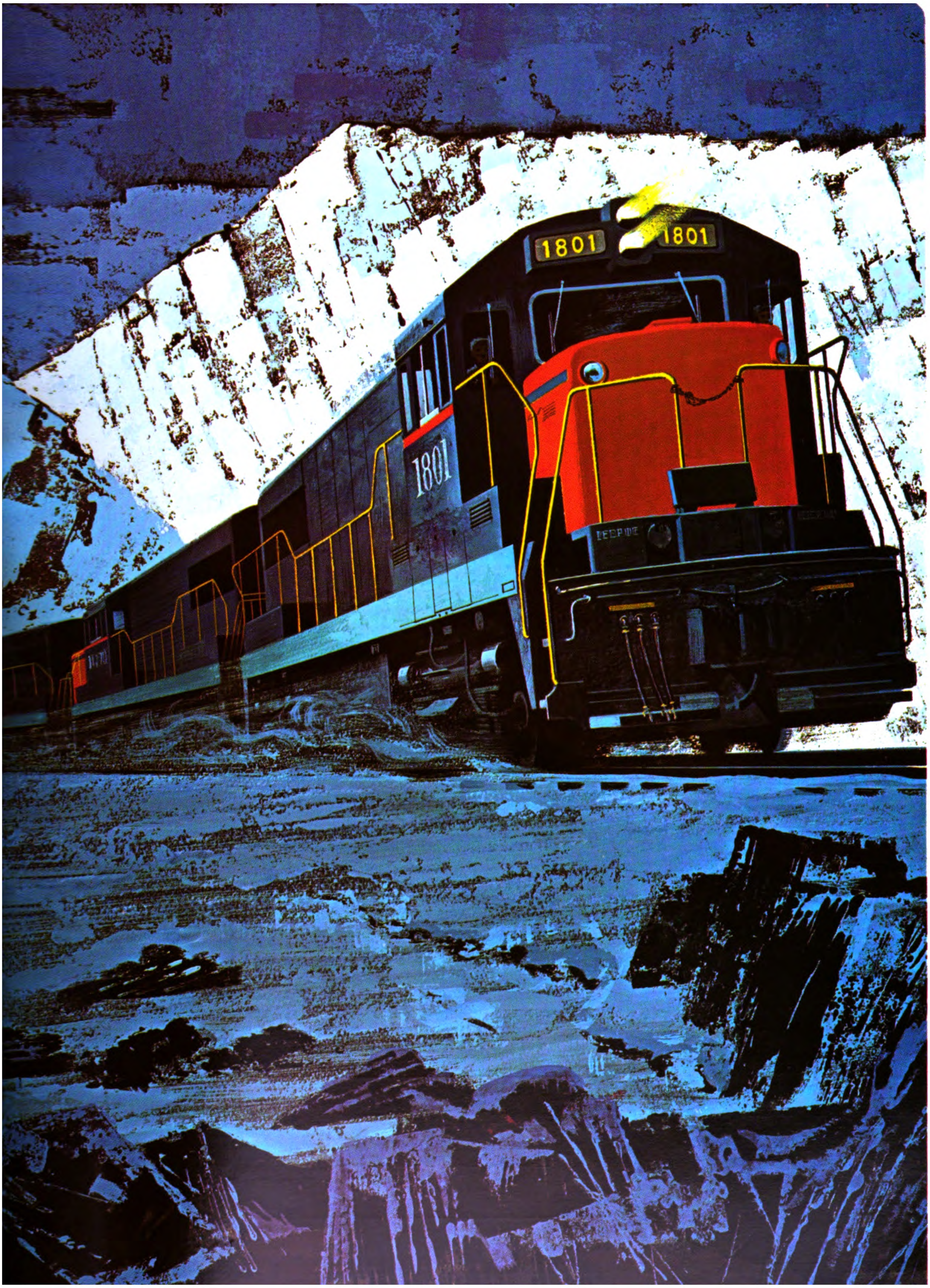
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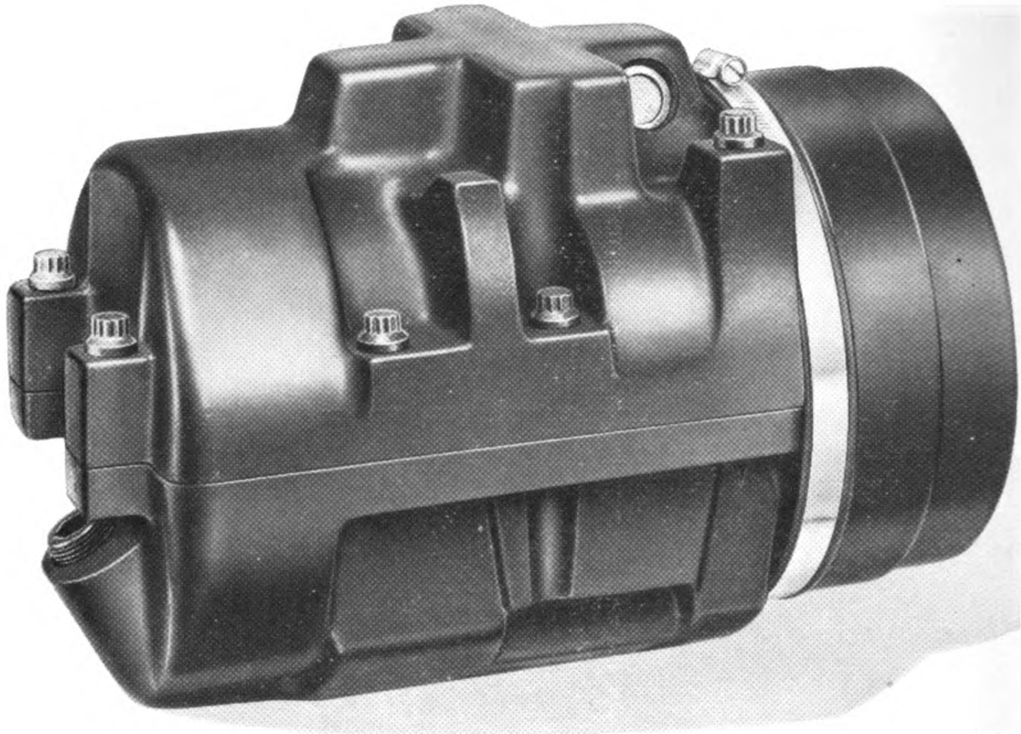

Editorials

MD's New Power

was no great surprise when Electro-Motive announced ie first of the big diesel-electric power units on May 20 Chicago. Leading the field is characteristic of the comany that has maintained a pace-setting position in designig, producing and selling this type of motive power.

The 5,000-hp DD-35 is an unusual design because it is ıbless and has four-axle rigid trucks. Perhaps it might etter be labelled an "unexpected" design rather than "unsual" because the cabless B unit is no stranger to the ilroads and the nearly half-million pound load requires four-axle truck arrangement. However, previous locootives of comparable weight, such as the 4,500-hp Union acific gas-turbine locomotive weighing 460,000 lbs, were arried by two two-axle trucks at each end with a span olster transmitting the load from the center plates of the vo truck bolsters.

Regardless of any unexpected aspects of its design the ooster unit is just what EMD called it, "a big unit-reducig block of 5,000 horsepower to meet high horsepower equirements of railroads operating increasingly heavier rains at high speeds."

For some time it has been evident that there is an ecoiomic need for a larger diesel-electric power package than ias heretofore been available. Not all railroads can use 5,000-hp unit advantageously and certainly the more lexible 1,500 to 2,500-hp units will continue to be the ackbone of the nation's motive power fleet. But those oads using a large number of units to power either highpeed or heavy-drag trains should be most interested in a init that will substantially lower the number required. f there was an inherent economy in "three doing the work of four" why not have "two do the work of five"? That s how EMD put it when it said "One DD-35 coupled to ne GP-35 would replace five 1,500-hp freight units".

Although the DD-35 is the more spectacular of EMD's two new models the 2,500-hp GP-35, announced on the same date, undoubtedly will be the most popular. Both use the same basic components. These include a new engine, the 567-D3A, turning at 900 rpm compared to the 835 rpm of earlier models, and new electrical transmission and redesigned control equipment, described on Page 53 of this issue.

Prototypes of the two new models are scheduled for display at the big American Railway Progress Exposition, October 9-16, at Chicago. We are sure that the railroads will be as interested in this new motive power as they are in all equipment designed to help them do a better transportation job more economically.

Flexibility in Spot Repairs

Although designed to meet the specific requirements of the road it serves the Norfolk & Western's new car spot repair set-up at Norfolk, Va. has features that deserve study by all railroads.

Most spot repair systems are either in one building or at one track area. The N&W facilities have three separate specialized shop buildings with transfer tables serving the two track areas between the buildings, an arrangement that gives the production line exceptional flexibility. In most spot repair systems a car or locomotive is trapped once it starts through the line. If additional unscheduled work is required on such a unit it must be either recycled through the entire line or it becomes a "bottleneck" that delays production. This situation is avoided by the N&W's unique arrangement. Once a car leaves the repack building it can be either shuttled to any track in the next two shop buildings or taken out of the line and bypass either or both shops.

While the layout is especially noteworthy, other features such as the material-handling equipment and the tooling, described on Page 29 of this issue, help to make these fine facilities an exceptional spot repair arrangement. We are aware that most roads cannot "start from scratch" to build repair facilities, but the principles involved in the Norfolk & Western shop could probably be adopted for less extensive and more modest installations.

American Railway Progress Exposition

The big American Railway Progress Exposition next October in Chicago keeps getting bigger. In the last month about 40 more companies have been added to the Combined Railway Suppliers exhibit list, bringing the total to over 300, with 52 now scheduled to have track exhibits. This kind of support by the railway supply industry deserves equal support from the railroads. Railroads should permit as many men as possible to attend the Exposition. Both the meetings and the exhibits will be worth while.

Meeting schedules of the mechanical department associations have been arranged to allow free time for viewing the exhibits. The AAR Mechanical Division is holding only a one-day annual meeting on Friday, October 11, at McCormick Place, although committee meetings will be held during other days of the first week. Those attending this meeting will undoubtedly arrive early and have time on Wednesday or Thursday for the exhibits. The four Coordinated Associations, with three-day meetings at McCormick Place set for Monday through Wednesday noon, October 14-16, have not scheduled any meetings on Tuesday afternoon, October 15, to inspect the exhibits.

We will publish the full program of the mechanical department associations as soon as the program details are known. In the meantime we urge all railroad men to make plans to attend this outstanding event that will demonstrate the progress being made by the nation's transportation leader.

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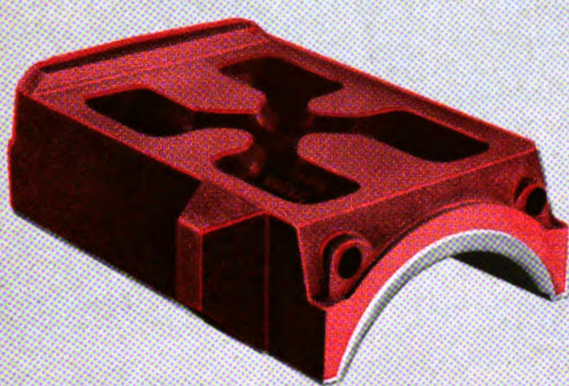
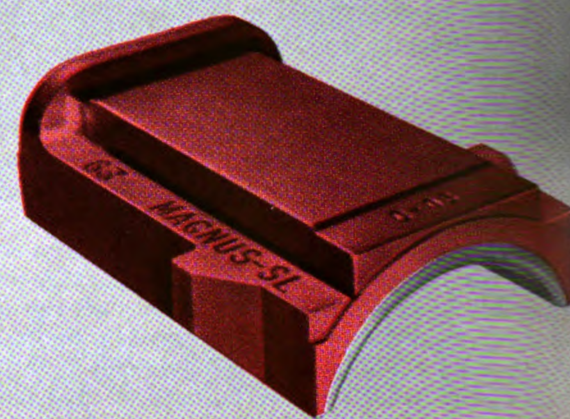
Give you still longer car bearing life, may double bearing performance you're getting now.



FLAT-BACK BEARINGS
(AAR Alternate Standard)



NEW HI-HAT BEARINGS
(AAR Test-Approved)

Magnus Flat-Backs stay seated on the journals, eliminate excessive fore-and-aft movement under all normal operating conditions. That means full fluid oil film lubrication, maximum bearing performance all the time. Rear seals and bearings last longer. 2,000,000 car miles per hot box is a realistic goal for Flat-Backs.

Developed by AAR research, 10,000 carsets of Hi-Hat bearings are now authorized for interchange. They stabilize journals too. Wider wedge-journal box column contact area lets wedge take brunt of impact forces. And Hi-Hats are lighter—can save real money if current operating tests prove satisfactory.

For helpful, detailed information, write Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

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ıtering shop, cars first pass through repack building and can then go through, or bypass, the repair and air-brake buildings which follow.

ʖpot Shop Consolidates Car Repairs

Tooling and facilities designed for periodic and running repairs for half of Norfolk & Western open-top-car fleet

Maintenance of the Norfolk & West-ꞃn open-top car fleet is being concen-ʼated at two points. By centralizing eriodic and running repair work for s 60,000 hoppers and gondolas the ɔad is stepping up the efficiency of its quipment maintenance and, simul-ıneously, increasing equipment avail-bility.

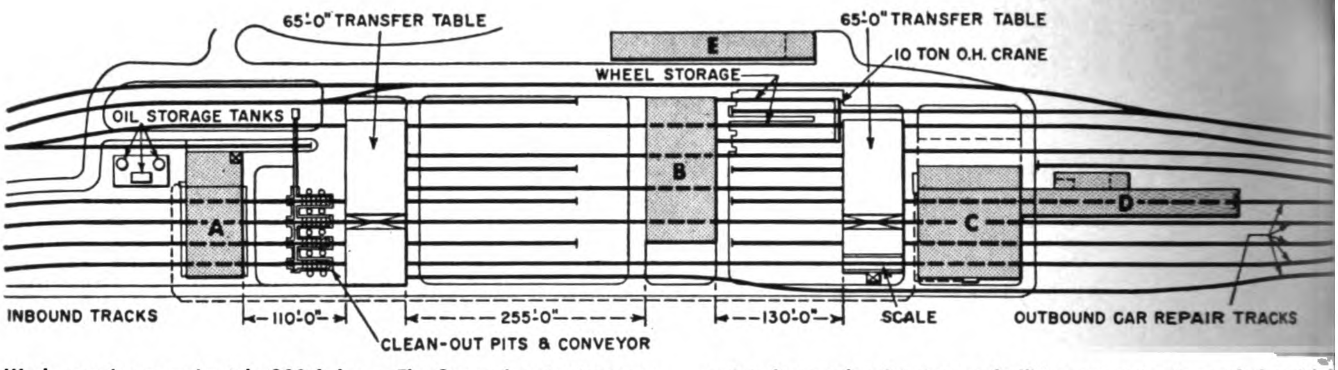
Norfolk, Va., and Williamson, W. ʼa., always important car-repair points n the N&W, have been selected as the ites for the new operations. Both are eing tooled as highly developed spot ystems. While the Williamson shop, till under construction, has been es-ıblished in the former steam-locomo-ve roundhouse, the Norfolk facility is ompletely new. This has made it pos-ible to achieve at Norfolk an arrange-ıent assuring smooth, unimpeded ow of cars, with full-time utilization f manpower at each of the work pots.

The new facility is the only car repair plant in the nation which is arranged for the servicing of open-top cars directly after unloading operations at a coal pier, and it has built-in features originated by the N&W which make the shop among the most modern and efficient in the country.

Most unusual features of the Norfolk shop are the two transfer tables which make it possible to place each car on those tracks which are individually tooled for the specific repairs which are required.

The railroad has long experience with the production concept for running repairs to freight cars. About fifteen years ago a four-track spot facility for open-top cars was put in service at Bluefield, W. Va. (Railway Mechanical Engineer, Sept. 1948, p 473). Subsequent experience has shown that continuous, uninterrupted production is difficult in such an installation. Even though, before starting through spot tracks, careful preliminary inspections are made and shop cars are classified according to the type of repairs they will require, production lines will frequently be tied up by finding a car on the wrong track, or by discovering that a repair involves more operations than originally planned.

Currently at Norfolk the N&W is completing what is said to be the largest and fastest coal-loading facility in the world. In designing to dump hoppers and gondolas at a 250-per-hr rate at the new Pier 6 at Lamberts Point in Norfolk, it became necessary to effect major revisions in load and empty yards and in car-repair facilities. Even before any decision had been made about building a new pier, however, the mechanical department had concluded that a relocation and rearrangement of car-repair facilities could in-increase its operating efficiency. As early as 1956, relocation of the repair tracks for open-top cars from beside the inbound load yard to a new site adja-



Work area is approximately 900 ft long. The five major structures are (A) the repack building and its attached oil house, (B) the car-repair building and wheel-storage area, (C) the air-brake building, (D) the paint shop and paint-storage facilities, an extension of the air-brake building, and (E) the office and locker building, including the maintenance area for shop trucks.

cent to the outbound empty yard, was shown to be desirable. Nothing was done, however, until 1961 when the Pier 6 project was authorized.

In the course of expanding the empty yard to accommodate cars from the new pier, it was found that the car-repair facilities could be located within the yard. Such a location makes it easy to put bad-order cars on the inbound leads of the shop which are capable of holding a total of 176 cars. These inbound tracks, the actual repair area, and the outbound tracks cover about one mile—actually the entire length of the empty yard. The repair area itself is concentrated within a 900-ft long section toward the outbound end.

The repair facilities have been spaced out to produce car-storage areas in advance of each individual shop so that any interruptions in delivery or flow of cars will not leave any of the production stations without work. In the production area are three specialized shop buildings:

- Repack building, a 60- x 96-ft structure over four through tracks, with an attached 60- x 41-ft oil house;
- Car-repair building, a 75- x 155-ft structure over four through tracks;
- Air-brake building, a 110- x 95-ft building over four through tracks, with an attached 110- x 24-ft air room, and, over one outbound track, an extension 220 ft long which serves as a paint shop.

Even though each of the three shop buildings is built over four production tracks, none of the tracks extends from one shop directly into another. The intervening areas between the three shops are served by the transfer tables. This means that a car emerging from the repack building, reached first on the production line, can be delivered to any track in each of the two subsequent shops and can, if necessary, bypass either or both of them.

There is no need for recycling cars through an entire repair line, or for delaying the line because individual cars are found to need additional, unscheduled work. Consequently, N&W could afford to equip individual tracks with highly refined tooling to do specialized jobs. Such refinements could not have been justified if it had been necessary to install them on four tracks.

Shop's Objectives

As defined by the work study made while planning the facility, there are four classifications of repairs for open-top cars coming to the Norfolk shop:

- Periodic work of a preventive-maintenance nature, including mandatory journal-box repacking, and air-brake cleaning;
- Ordinary running repairs;
- Supplementary repairs resulting from dumping operations on coal piers;
- Betterments involving installation of additional or improved components on cars.

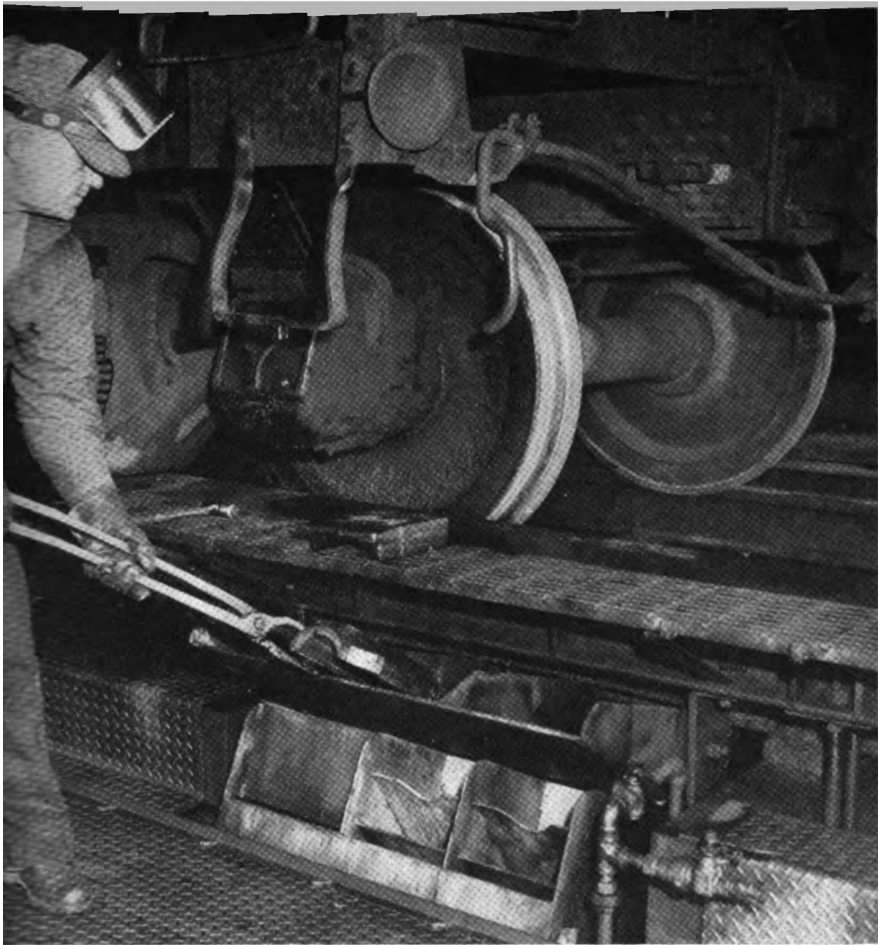
Inspectors in the "barney" yard at the coal dumper pinpoint cars requiring shopping. As cars roll from the dumper, they can be moved directly into one of the four inbound tracks. They function only as a storage area for shop cars. Each track is protected by two banks of retarders and by split-switch derails. Inbound switches have electric locks to protect car moving and shop operations as cars are being pulled into the shop.

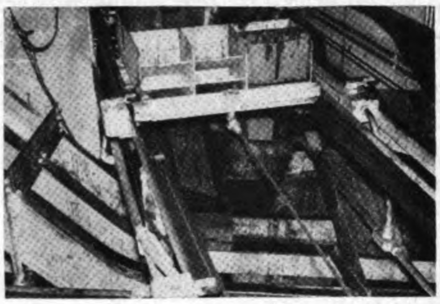
Every car passes through the repack building where, in addition to all journal servicing, a complete inspection is made. The employee who makes this check marks up a standard "original record of repair" card which is placed in a plastic envelope that is hung from a leading-end handhold. This stays with the car as it goes through the line. Because this inspection determines the tracks the car will traverse in the two subsequent shops, the track numbers are chalked on the corner post or end.

Tracks in the 60-ft repack building are pedestal mounted to place journal boxes at convenient working height. Pneumatic side-frame jacks have beams on top which are long enough to make it possible to work all the journal boxes of any car, regardless of length, with no additional spotting once the car has been placed in the shop. Under-track conveyors are used for removing used journal-box components directly from the points where they come out of the cars and for delivering new or renovated components to each side of each car truck. The push-button-controlled conveyors run from beneath each track into the oil house which is adjacent to the repair building. In the oil house are:

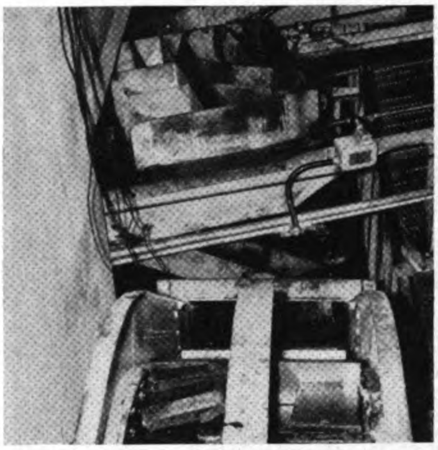
- A complete installation for renovating and impregnating lubricating devices;
- A car-oil reclamation unit;
- Storage facilities for new and used journal bearings and wedges.

The conveyors which move beneath the floor and running rails in the repack building are track-mounted and have special compartments for bearings, wedges, and lubricating devices. This makes it possible for the main conveyors, which dump automatically as they enter the oil house, to drop the components onto special auxiliary conveyors—one for delivery of used bearings to a scrap box, another for moving used wedges to a second scrap box, and a third for delivering lubricators to the renovating equipment.



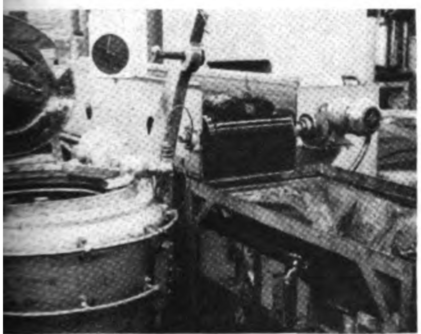


Conveyor dumps bearings and wedges automatically onto auxiliary conveyor (bottom).

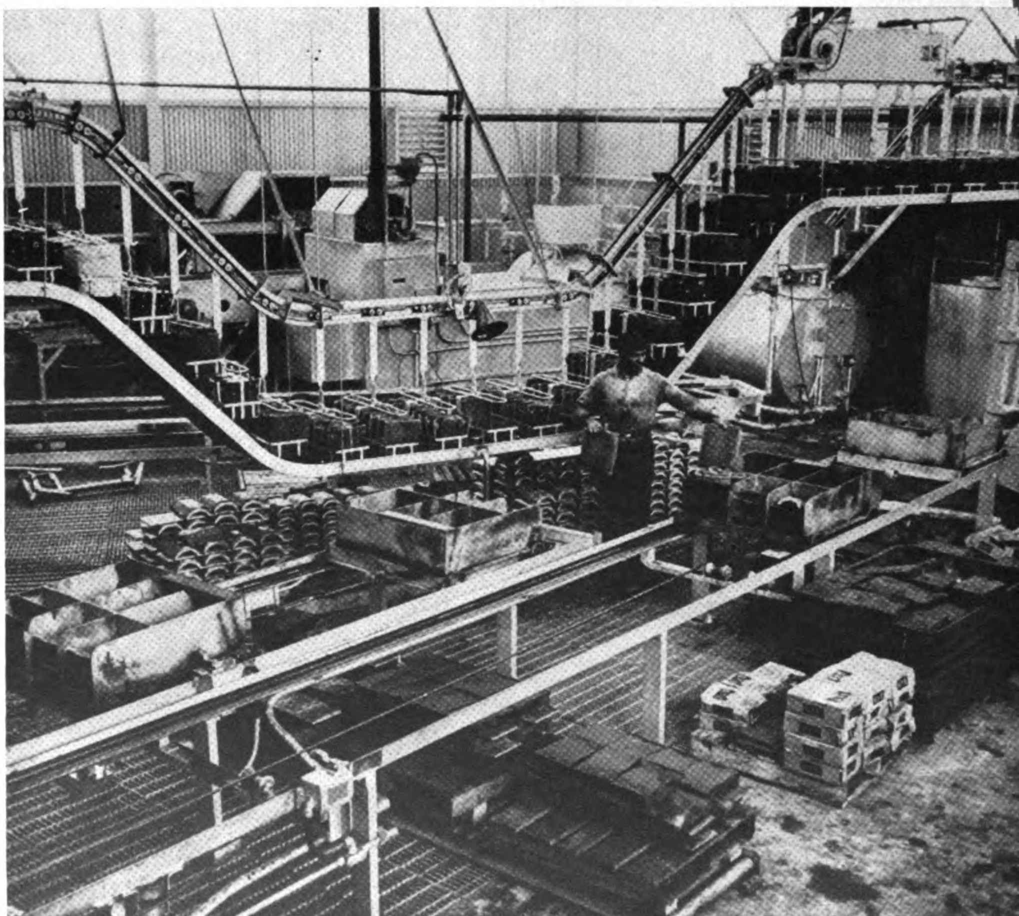


ıring removed from jacked truck is placed in under-track conveyor for movement to oil house. ıveyor also delivers complete new set of components for repacking the cleaned journal box.

Bearing and wedge (foreground) move on auxiliary conveyors to separate scrap boxes.

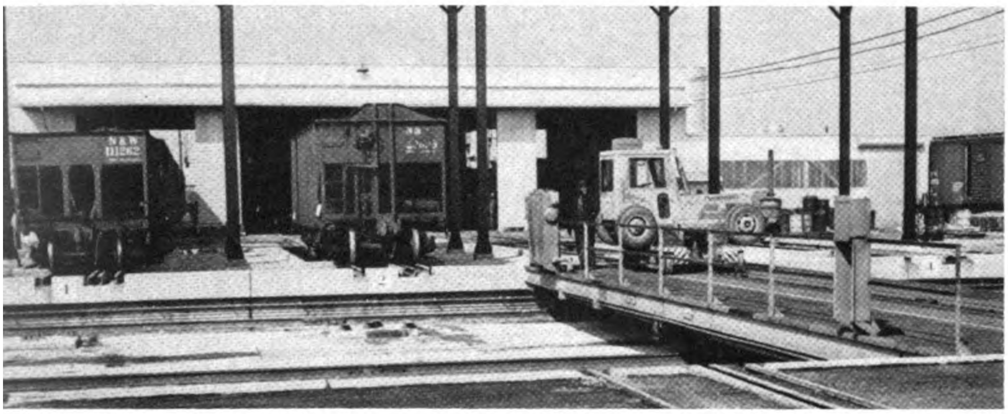


ɔricators are delivered automatically to wash- machine (left) by belt from main conveyor.

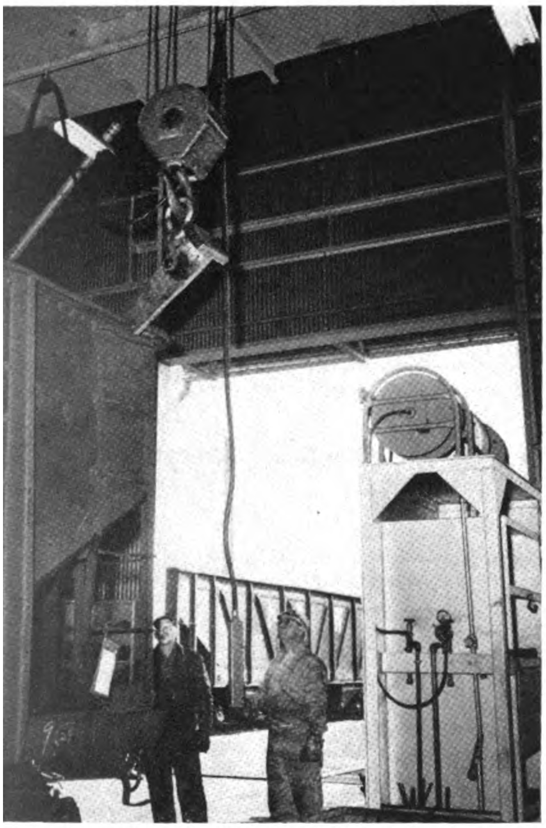


ɪd height is checked to accord with AAR speci- ɪation. Pads are then loaded onto conveyor.

Dual conveyor tracks converge on area where journal components are stocked and where overhead system moving clean pads drops for easy loading of four conveyors.



Cars leaving repack building move to first transfer table over pits where cleaning will be done. Transfer table has rabbit car movers which can be extended beyond pit.



Bulb-angle straightening device is powered by 10-ton overhead crane in repair building.

Most unusual features of the lubricator reclamation system is the overhead-rail conveyor which carries baskets, each of which holds a car set of eight lubricating devices. New or renovated pads can be placed in the baskets for immersion in car oil, following which they are moved to the ends of the under-track conveyors. Wedges and bearings for installation in cleaned journal boxes are also stored at these points. All materials are ordered by an intercom system between the work sites and the oil house from which they come.

Hose reels at each of the repack stations deliver solvent and compressed air for box cleaning and car oil for free oiling following box repacking. A suction system removes oil from boxes after pads are removed.

The 65-ft transfer table is push-button controlled. N&W calculated that the length would be adequate for any open-top car which might be built in the foreseeable future, regardless of its capacity. For some time the railroad has had a program of building 85-ton hopper cars which have an overall length of 48 ft 8 in. Just recently a prototype 100-ton hopper was completed at Roanoke shop. If the car requires no body repairs or wheel work, it can bypass the car-repair building on either of two tracks, going into the air-brake shop or directly to one of the outbound tracks.

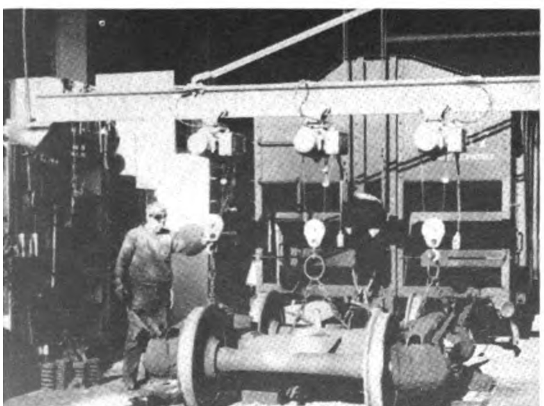
From the transfer table, cars requiring repair can be placed on any one of the four tracks passing through the 75-ft long car-repair building. Tracks between the transfer table and this car-repair building can each hold five cars, assuring uninterrupted production at each of the work stations within the building. In addition, there are three set-back tracks, each holding four cars, on which are spotted those which must be held for material, again avoiding delays to regular production. Two of the tracks passing through the building are designated for light repairs such as the straightening of safety appliances, or renewal of truck springs, couplers and draft gears.

On a third track, classified for medium repairs, work, such as car-body patching, welding and straightening, is done. The fourth track, equipped with jib cranes and electric hoists for truck disassembly, handles wheel changes and truck repairs. Each track in the car-repair building has its own 10-ton overhead crane. The crane over the wheel track can be operated through the end of the building into a storage yard where mounted wheel sets, truck side frames, and bolsters are stored. The most commonly used wheels are handled from the wheel flats to and from the repair areas. Tractors are used for moving cars to and through the car-repair building and in the air-brake building which follows.

In addition to the four repair tracks which pass through the air-brake shop from the transfer table, there are two additional tracks which can be used to bypass these areas.

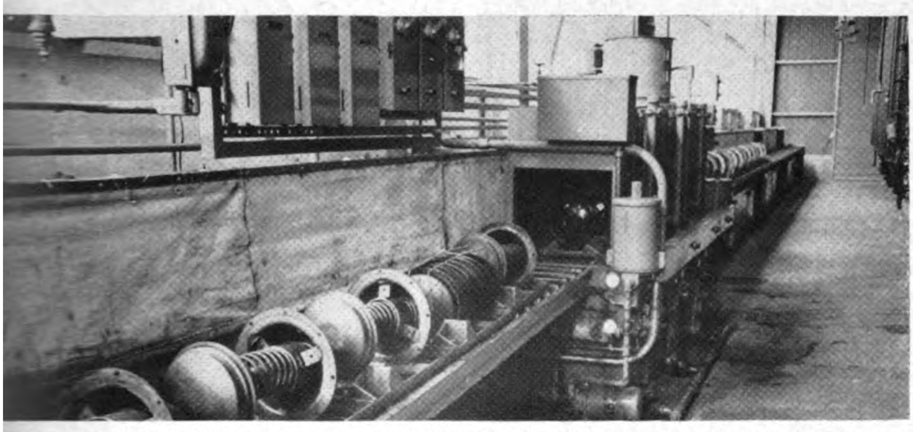
Each track in the brake shop holds two cars. Because tools and components are relatively light in weight, no effort is made to classify cars as they are delivered. On any of the tracks cars may be given in-date tests, regular 48-month COT&S attention, or special repairs. Except when due for painting, cars are then moved to one of the outbound tracks, from which they may be returned to the transportation yard by switching crew.

While all necessary equipment for testing air brakes already has been in-



Hoists on pivoted jib crane simplify truck repair. Overhead crane moves in new wheels.

Powered jack is used for removing and installing draft gears in repair building.



'allet-mounted air-brake pistons are moved through three-stage cleaning machine on roller con-
'eyor. Overhauled piston assemblies return on second conveyor in canvas "tunnel."

Brake-cylinder piston is disassembled and rebuilt while remaining in special machine.

stalled in the new shop, and a new machine for cleaning the air-brake pistons is in operation, the work of cleaning and renewing brake valves at Lamberts Point awaits completion of the shop's air-conditioned air room, adjoining the air-brake shop, which is expected to be opened soon.

Like other units of the new car-repair plant, the air-brake shop has its tools and equipment arranged for maximum efficiency and convenience. Single car-test devices for making brake tests are suspended in the clear on balancers from overhead and may be moved easily to the work location along any of the repair tracks. "Lazy Susans"—circular and revolving trays with a variety of small parts, such as couplings, fittings, nipples and U-bolts, needed in repairing the equipment—also are within handy reach.

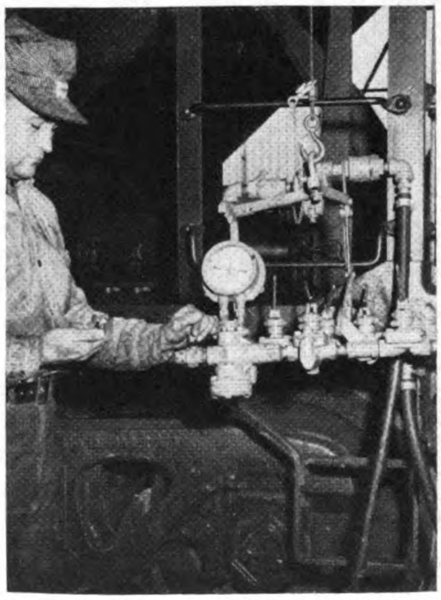
The equipment for reconditioning brake-cylinder pistons consists of two power-driven parallel roller conveyors along one side of the shop and machines which clean and recondition the pistons. One of the conveyors moves the piston on a special pallet to a three-stage automatic cleaning machine where the piston is washed in a solvent and delivered by gravity roller conveyor to the reconditioning machine. This machine was designed to accomplish all reconditioning operations without removing the piston from the machine. After the reconditioning, the operator places the piston on the pallet from which it was removed, touches the transfer device operating valve with his foot, and the pallet is moved to the second conveyor and on to a storage area protected from dust by a tunnel.

If cars are due for painting, they pass into the 220-ft-long paint shop having heating and exhaust equipment for the application of the one-coat, direct-to-metal finish now standard on N&W open-top equipment. Spraying is done manually from elevated trackside platforms. The building, which can accommodate five cars, is insulated and is heated with hot-water radiators to hasten drying. Cars are painted under the exhaust canopy in the first position and are dried and stencilled in the other four positions. A paint-storage platform is adjacent to shop. Overhead and floor-mounted electric radiant heaters are used in the repack building and overhead gas radiant heating in repair and air-brake buildings. The paint shop has a separate hot-water heating system to produce the temperatures needed for the warming and drying of cars. High intensity lighting is installed in all shop work areas.

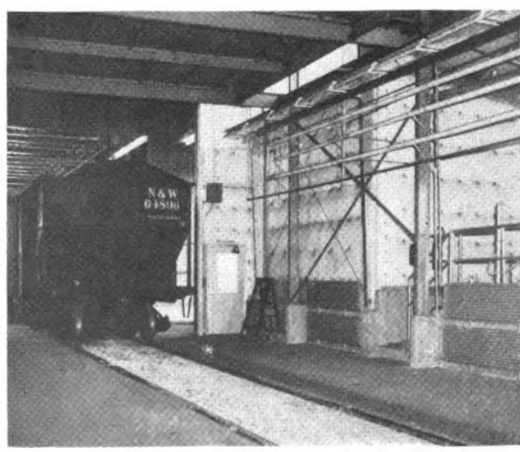
The stores department personnel stock the material bins and storage areas at the individual work stations.

The current daily one-shift operation turns out about 90 repaired cars. Average repair time for a car is approximately 7 hr. It is possible, however, for cars to be put through in as little as 1 hr, although this is not standard procedure. The ninety cars turned out daily include approximately 25 which have had brakes cleaned and 40 with repacked boxes.

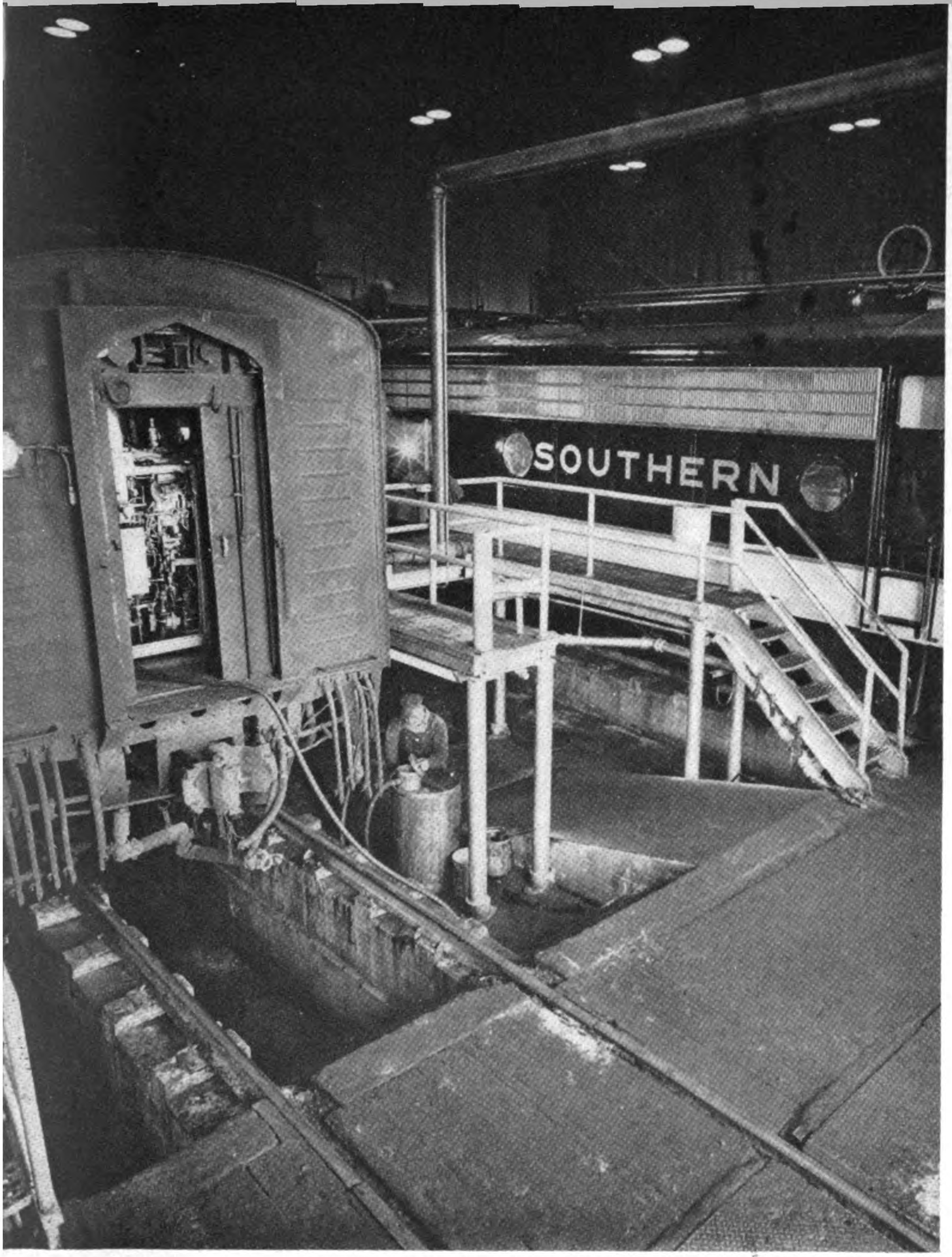
It is estimated that, on a one-shift basis, as many as 150 cars could be turned out. Business or other conditions might eventually require another shift. Although neither the Norfolk nor Williamson shop has not yet had full production, every effort is now being made to do all of the periodic work at these points. It is anticipated that this will soon be the case. At that time, other points will do only emergency repairs on open-top cars.



Single-car brake-test devce is suspended from overhead balancer carried on tramrail.



Paint shop includes paint pump and storage area (right) and exhaust canopy (top).



More than one steam generator can be cleaned at one time. Solution is checked every 20 min.

Faster, Safer Descaling for Steam Generators

A major maintenance bottleneck has been eliminated by the Southern with the development of a safe effective procedure for descaling Vapor steam generators. The method, developed at the Pegram Shop in Atlanta, Ga., has been adopted throughout the system. Based on a dry acid formulation, it has proved safer, twice as fast, and less expensive than the previous practice of cleaning with hydrochloric acid.

As the Southern's key locomotive maintenance center, Pegram Shop maintains steam generators for approximately 110 diesel units. Normal operation calls for acid cleaning of all generators once a month during the mandatory ICC washout. Despite careful water treatment control, scale is always heavy enough to warrant such cleaning. This does assure continued efficient operation of the generators and minimizes road failures.

Cleaning with hydrochloric acid posed several problems. Fumes w bothersome to employees and co sive to equipment. Expensive, a resistant pumps were needed, al with special heavy tanks for acid st age. Because the equipment was large to be portable, work could done only on two adjoining tracks the diesel house. This lack of flexib ty resulted in delays, generators of service because of missed cleaning, and actual damage to u from the acid itself.

Southern suggested a search fo scale removal agent that could be culated through the generator c and controls by using the unit's o feed water pump. The project assigned to the Southern's test depa ment. Ideally, the product should an efficient non-corrosive scale mover. If such a cleaner could found, an empty 55-gal steel drum a some rubber hose would be all cleaning equipment necessary.

After evaluating a number of pro ucts, a formulated cleaner offered the Dearborn Chemical Co. was lected. The product, known as Sca Cleen, is based on Du Pont sulfam acid. It was thoroughly researched Southern's laboratories to determi its effect on all metals in a steam ge erator system before being put in actual use. After passing these tes the product was used in limited fie work on actual cleaning jobs.

As a further check, a special co centrated test was made on a stea generator water pump. A strong ac solution was prepared in a steel drum Temperature was maintained at a proximately 150 deg F. The solutio was then circulated continuousl through the pump for 24 hr—approx mating several years of actual on-th job cleaning. The pump was then tor down and examined for damage. Non was discovered. The dry acid cleane was then tested on operating units fo several months, and careful record confirmed its effectiveness.

It was found that the powdered aci permitted faster results than hydro chloric acid. The average time neede to clean an entire system is from 4(min to 1 hr. Using hydrochloric acid the time was asually 2 to 4 hr.

The sulfamic acid based cleaner i packaged in powder form in 300-lb disposable fiber drums, eliminating the extra shipping costs and breakage hazard associated with glass carboys or specially lined drums. Storage

:e is reduced greatly. Any accital spillage can be swept up. The ıner is mixed with water on the t to make up the acid solution.

ıafety ranks high with Southern, this product scored extremely l. Dry or in concentrated solution, not harmful to skin and gives off fumes even when heated to a high ıperature. Maintenance personnel ıg the cleaner came quickly to prethe powder over hydrochloric acid.

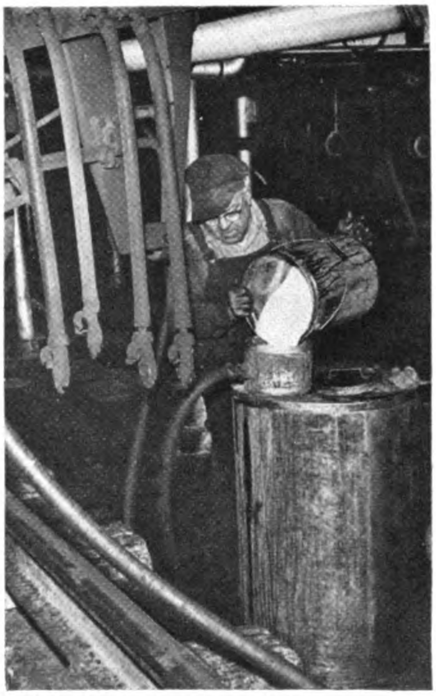
\ll descaling is now done with a table 55-gal stainless-steel drum l two lengths of rubber hose. Pem shop has two such drums, and) jobs can be handled simultaneous- A filter is built into the top of the ım to strain chunks of scale and dge from the solution coming ough the return line. Circulation is ›vided by the steam generator's ter pump on the diesel unit itself. l equipment can be moved readily handle descaling jobs anywhere.

One man now handles all acid :aning—sometimes two jobs at one ıe. After getting one operation under ıy, he is free to move to another ot and set up a second cleaning job perform other work. At approxiately 20-min intervals he returns to ıeck the acid strength. If scale is ;avy, additional dry acid formula ust be added occasionally to keep e cleaning solution active. A simple :ration kit is used by the maintenance an to test solution strength.

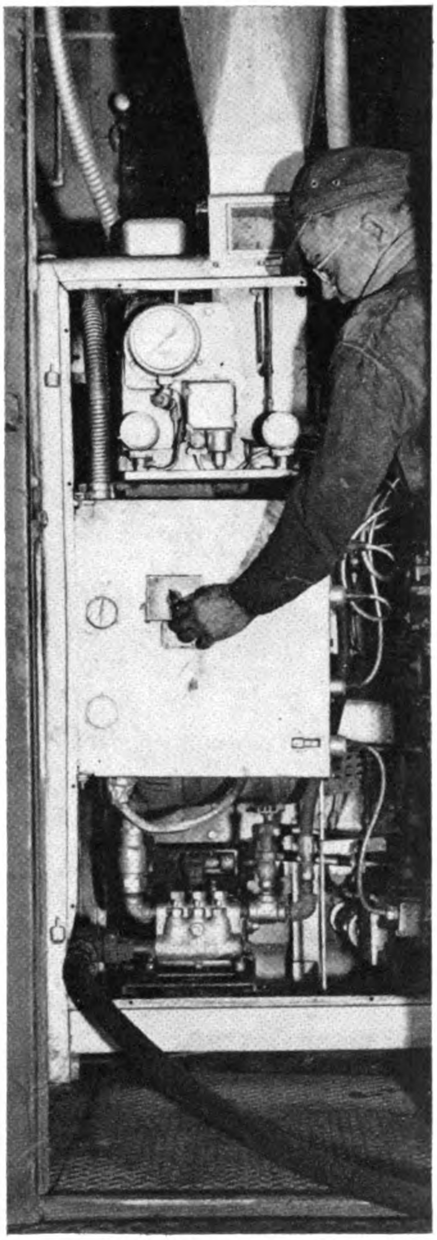
Time saving has been noticeable in ore ways than one. Preparation effort negligible, consisting of simply con-:cting a hose to the water pump sucon side for introducing the acid ›lution, and connecting another one) the coil blowdown valve to act as return line, with the loose end in the ıake-up drum filter. The make-up rum is then partly filled with water, ıe necessary amount of sulfamic forıulation is dissolved, and the job is :ady to begin.

First, the jumper line between the ıtermediate and outer coils is disconıected and inspected for scale buildıp. If scale is light, approximately 15 b of acid are dissolved in the drum. f scale is fairly heavy, 30 lb are used o provide extra cleaning power. Averıge is about 22 lb. The amount of ;cale in the jumper line does not alvays give a true picture of conditions :hroughout the system, but it can be ısed as a reference point for determining initial solution strength.

Inspection of jumper indicates scale thickness.



Inhibited sulfamic acid is added to water.



Generator is fired briefly as solution circulates.

Coils are usually cleaned while the steam generator is still hot. Acid solution is kept hot (140 to 160 deg F) while in use.

The following procedure is followed normally:

1. Back blow through coil blowdown.

2. The three-way washout valve is closed and the water bypass regulator is set at 230 psi. The cleaning solution is circulated through the servo and all coils. Cleaning solution returns to the make-up drum. Coils are normally clean after approximately 40 min of continuous circulation.

3. After coils are cleaned, the separator blowdown is closed and acid solution is pumped through the steam trap and heat exchanger for approximately 15 min. to clean these sections. To prevent popping, the water bypass regulator is turned back to from 100 to 150 psi.

4. The entire system is then rinsed with fresh water.

5. Back blow through coil blowdown again.

6. Recheck the jump line to be sure it is thoroughly descaled.

The descaling solution is often reused up to six times, offering additional economy. If solution strength becomes low, more acid cleaner is added.

The system has proved itself to be safe, efficient, and economical, contributing in a small way to the ever-present battle against rising operating costs.

COMING...2 NEW LOCO

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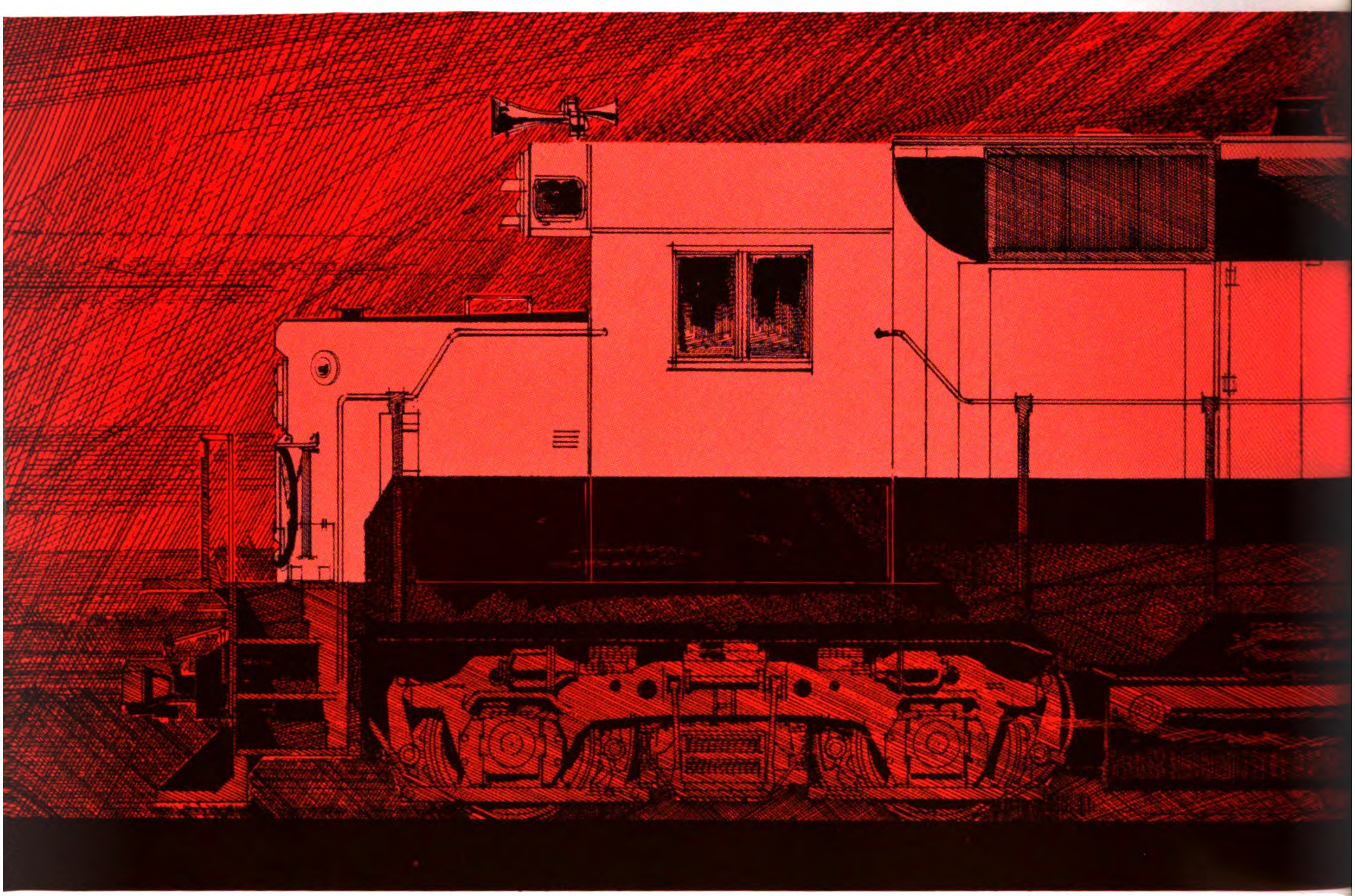

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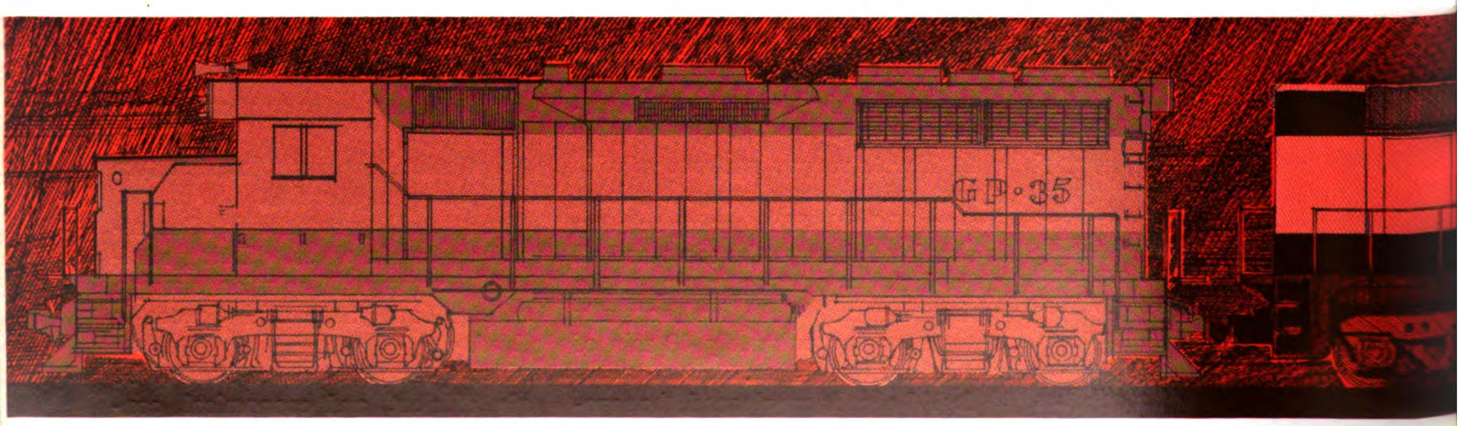
2500 horsepower... a new member of the General Motors "Geep" family, with improved components for even greater maintenance reduction. 2500 horsepower with broad range capability for fleet efficiency, to bring more speed or heavier tonnage to today's freight schedules, to replace or work in consist with earlier model locomotives . . . promising the railroads more profitable gross-ton-miles per hour than ever before.



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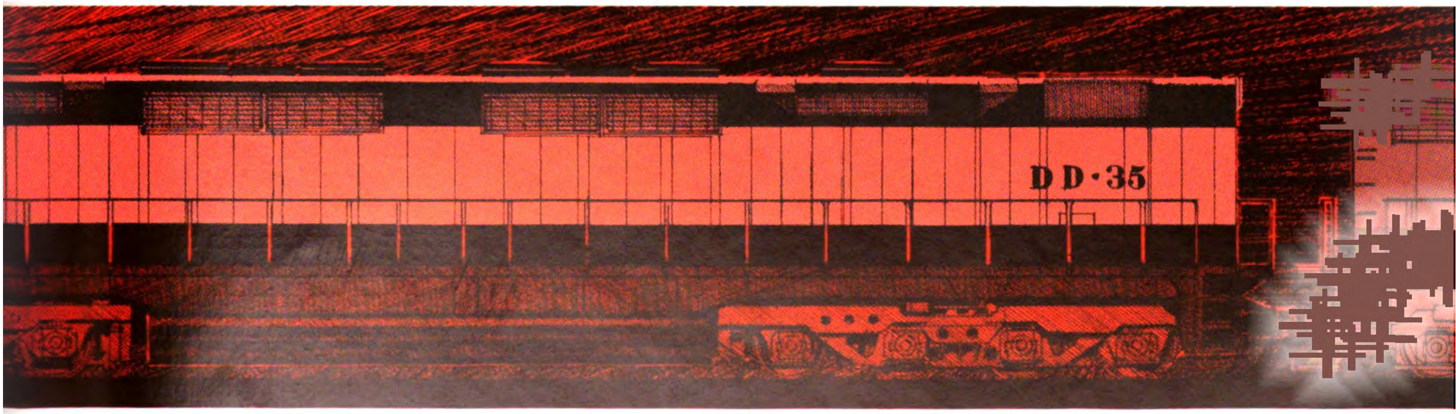
5000 horsepower... a new block of mainline motive power — two GP-35 power plants in one unit — with four axle trucks, bringing the lowest cost horsepower ever put in a locomotive consist. Compatible motive power that will perform at continuous rating with existing road freight power, offering the railroads new profit making advantages in unit reduction, speed and tonnage ... practical motive power to meet the changing needs of America's railroads.



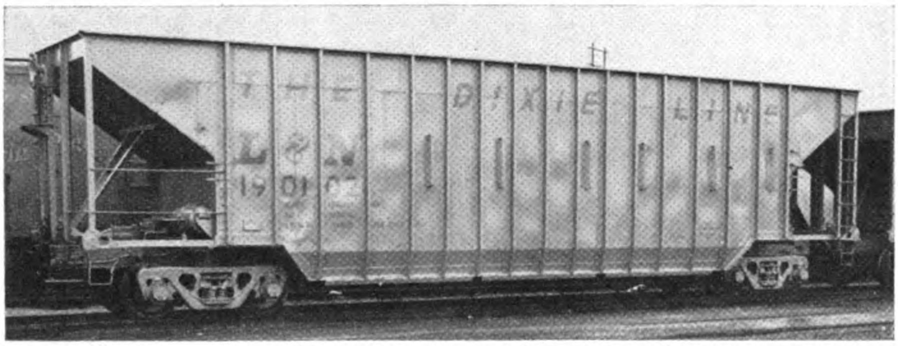
ELECTRO-MOTIVE DIVISION · GENERAL MOTORS · **LA GRANGE, ILLINOIS**

HOME OF THE DIESEL LOCOMOTIVE · **In Canada:** General Motors Diesel Limited, London, Ontario

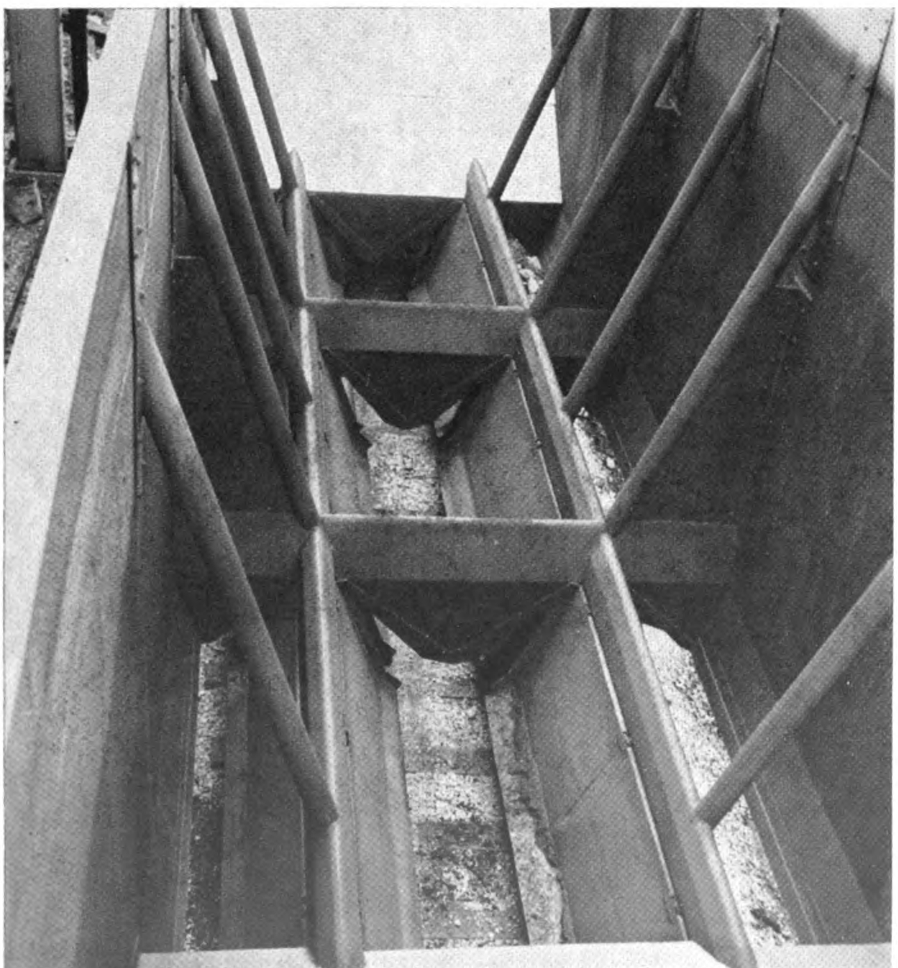
More 100-Ton Hoppers Are Coming

Open-top hopper cars capable of handling 100 tons of coal have moved from planning and prototypes to actual production. Bethlehem Steel is building 400 such cars for the Missouri Pacific; the Louisville & Nashville will, this summer, begin in its own shop construction of 50 cars for an integral train service it plans; and the New York Central and the Norfolk & Western have recently completed prototype 100-ton cars aimed at determining the suitability of their individual designs for integral train services which are being projected.

The 400-car MP order is the first Bethlehem has received for the large-capacity car. The design is similar to that of the successful AAR 70-ton alternate standard hopper car developed five years ago by three major coal-hauling railroads — the Chesapeake & Ohio, the Norfolk & Western, and the Pennsylvania. Approximately 5,000 of the 70-ton cars have been produced by Bethlehem car shops, and many more have been turned out by other carbuilders and by railroad shops.



Fifty cars like this prototype will make 450-mile round trip in 24 hr. Electrically operated doors emptied car in less than 30 sec at recent demonstration in Louisville.



Longitudinal doors eliminate problem of coal piling on rails while being discharged. New cars will have four pockets with 16 doors instead of three pockets and 12 doors in prototype.

The enlarged version for the Missouri Pacific was developed by Bethlehem's car engineering staff to carry 100 tons and will include four pairs of single cam-operated hopper doors to facilitate rapid discharge of lading. While the road will use the cars primarily for hauling iron-ore pellets, they are suitable for general service, being of sufficient cubic capacity to handle 100 tons of coal which is much lighter and bulkier than iron ore.

These cars will be almost 52 ft in overall length, will weigh approximately 64,000 lb when empty, and will be equipped with roller-bearing trucks and composition brake shoes. Practically all parts that come in contact with the lading are to be fabricated of Bethlehem Mayari-R, a low-alloy high-tensile, corrosion-resistant steel.

New L&N Cars

Construction of the 50 cars for the L&N integral-coal-train operation is scheduled to start in July. The 100-ton quick-unloading hopper cars will be built at the L&N car shop in South Louisville, Ky.

The 4,000-cu-ft cars are expected to enter integral-train service upon completion. They will haul coal from a mine near Paradise, Ky., to a Tennessee Valley Authority generating plant at Widow's Creek, near Chattanooga, Tenn. The quick unloading feature will permit a train to make a 450-mile round trip in about 24 hr. At present, the L&N is using 128 70-ton hopper cars in the operation, half being loaded at the mine while the others are being unloaded at the plant.

The design of the new car is a modification of a prototype car built by the L&N mechanical department in 196 (RL&C, April 1962, p 22). Each car will have 16 electrically operated longitudinal doors powered by one 10

hp motor that will permit the entire cargo of 200,000 lb of coal to be automatically emptied in less than 30 sec. Reduction in light weight to 63,000 lb from the prototype's 71,400 lb will be obtained through the use of United States Steel Cor-Ten, Tri-Ten, T-1 and T-1A steels. Stainless-steel lining on the slope sheets will eliminate the need of a mechanical car shaker or cleaner.

The prototype car has been in constant service since it was built. It has been timed to open its doors in 6 sec, dump the 100-ton cargo in 12 sec, and close and lock the doors in 8 sec. The automatic dumping feature is activated by an electrical contact when the car is positioned for unloading. The doors are closed electrically when the empty car pulls away.

Each new car will have a plug-in receptacle so that power from a stationary source can be fed to the motor. The 10-hp sealed motor, which will operate about 15 min daily, is to be mounted on the center sill underneath the floor at the A end of the car. It is expected to last the life of the car without maintenance.

Brake equipment will be at the other end. Future plans are to make the cars completely automatic by induction method. Electric power will be transmitted from a "land station" to the motors. The car doors can also be operated manually, like those on the prototype, either by lever or wheel, or by an air motor.

The cars are outside side-stake design, riveted and welded, with ⅛-in. side sheets. The complete underframe, sides and ends will be fabricated at the assembly site. Trucks, door mechanisms, motors, air brakes, and other small assemblies will be purchased.

All dimensions are the same as those of the prototype. These include length over coupler pulling faces, 52 ft 11 in.; over strikers, 50 ft 5 in.; over end sills, 49 ft 5 in. Inside length will be 49 ft 4 in.; inside width, 9 ft 7¾ in.; overall width, 10 ft 5¾ in., and overall height 13 ft. Differences in design include 13 side posts on each car side instead of 17; 38-deg slope sheets instead of 35-deg; a 10-hp motor instead of 7½ hp, and 16 doors instead of 12, maintaining the same length door opening of 24 ft 8½ in.

The trucks, with a wheel base of 6 ft, are equipped with 38-in. wheels, 6½ x 12 Hyatt roller bearings and Cobra shoes. Truck centers are 37 ft 5 in. Other equipment includes Equipco vertical hand brakes and Miner A-22-XB draft gear.

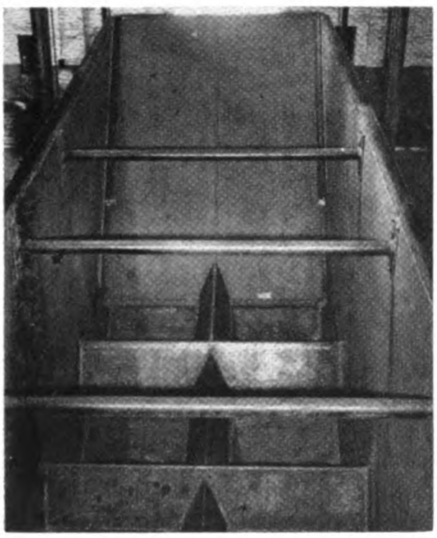
N&W Prototype

The railroad with the nation's largest fleet of 85-ton open-top hopper cars soon may be building them even larger. The Norfolk & Western has just completed a prototype 100-ton hopper car which is to be subjected to an extensive test program prior to any decision about the car's future.

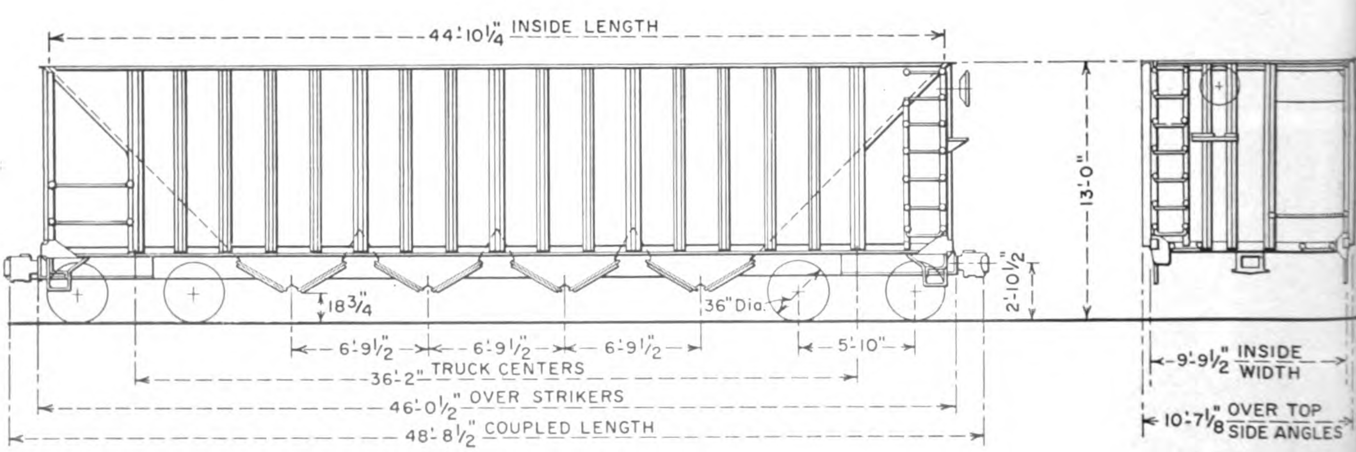
This 63,000-lb, 3,429-cu ft car, which N&W has designated as its Class H-13, represents the fourth major open-top car design produced by the road's mechanical department in the past six years. Almost a year ago the mechanical department was given the assignment of producing a car that would carry 100 tons and could be handled at existing facilities such as car dumpers. The car was completed by Roanoke shop a few weeks ago and is now to undergo several months of road service.

The N&W 85-ton hopper, an elongated version of the AAR alternate standard 70-ton car, which the N&W had designated as its Class H-12, has the same plate thicknesses and structural sections. Both are characterized

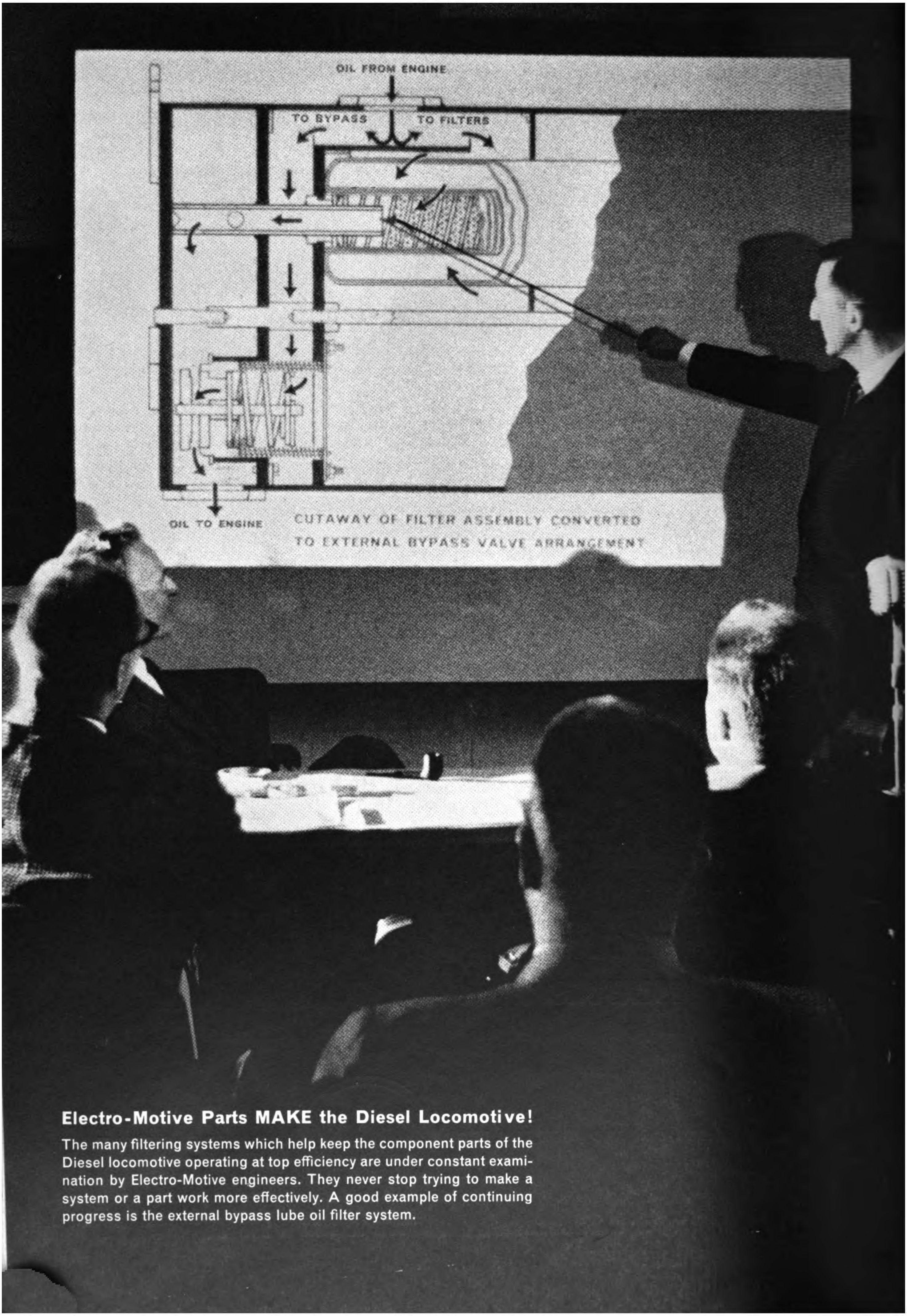
(Continued on page 52)



Stainless-steel slope sheet is supported its full length by six 4-in. I-beams.



Length and cross-section dimensions of 100-ton N&W Class H-13 are like those of 85-ton H-12. Height of sides and ends has been increased 2 ft.



Electro-Motive Parts MAKE the Diesel Locomotive!

The many filtering systems which help keep the component parts of the Diesel locomotive operating at top efficiency are under constant examination by Electro-Motive engineers. They never stop trying to make a system or a part work more effectively. A good example of continuing progress is the external bypass lube oil filter system.

External bypass lube oil system delivers cleaner oil to the engine

Put it to work on your earlier model locomotives!

Cleaner oil in the engine means *longer life for all wearing parts*, *reduction of carbon deposits in the oil cooler*, and *added protection to maintain close engine tolerances.*

New bypass design

The 40 psi *external* bypass lube oil filtering system, created through minor physical alterations to the original 17 psi *internal* bypass system, routes bypass oil around the filter chamber and directly back to the engine. This prevents carbon deposits on the surface of each filter cartridge from being washed back into the oil and eventually into the engine itself.

Reduces maintenance

The external bypass valve system offers reduced maintenance benefits, too:

- washing of carbonaceous material from filters is eliminated—assuring less frequent parts replacement.
- single 40 psi external bypass valve is maintenance-free.
- inlet baffle and new cradle permit use of cageless cotton cartridges.

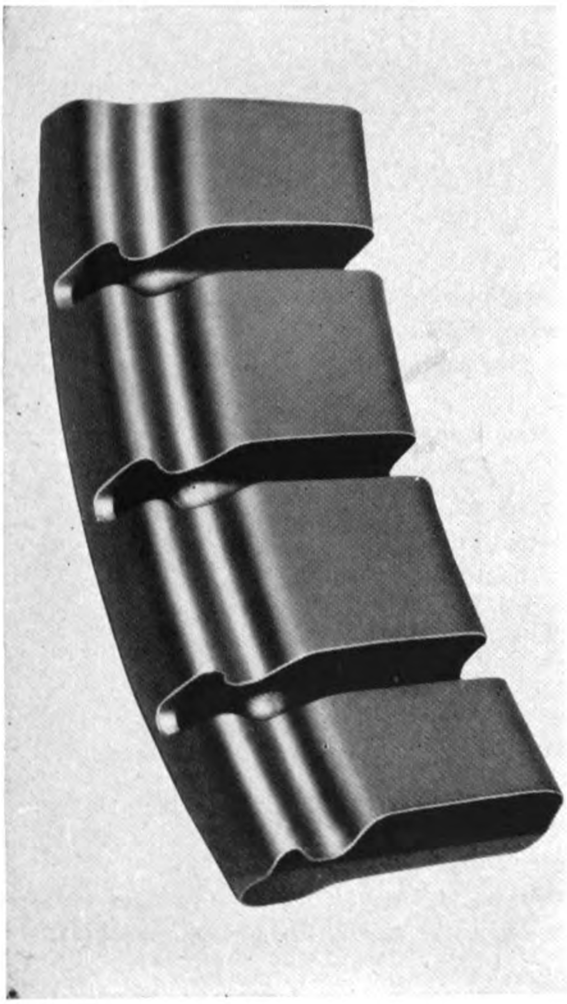
The Electro-Motive lube oil bypass conversion kit is all you need to put this improved filter system to work on earlier model locomotives. No extensive welding or additional piping is necessary.

Ask your Electro-Motive representative to give you further details. Or, contact Electro-Motive Division, LaGrange, Ill.

ELECTRO-MOTIVE DIVISION • GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario



outstanding economies

...in passenger service

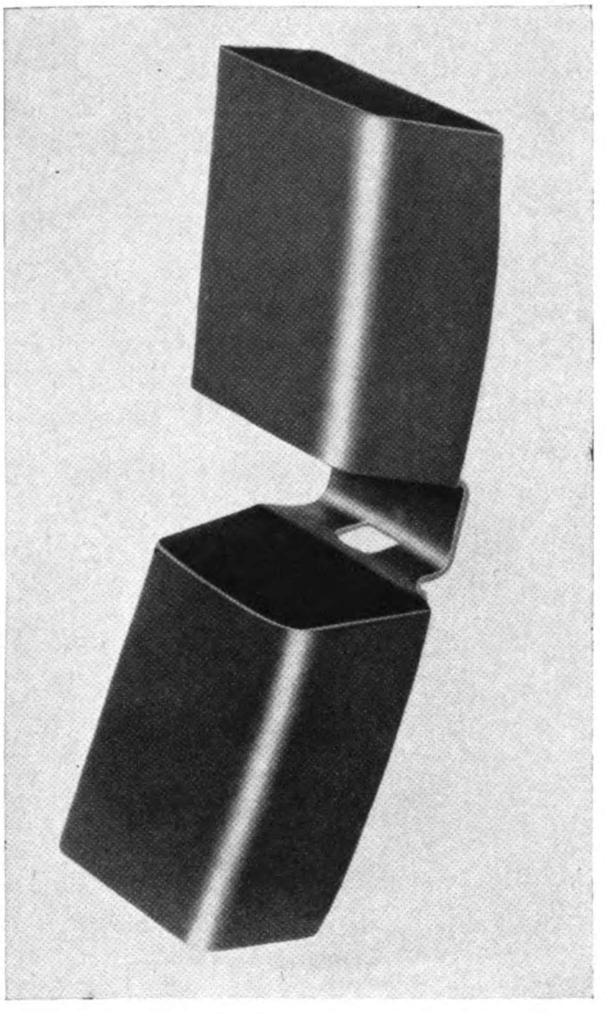
Seventeen cars on a crack passenger train were equipped with COBRA Shoes. Here are the results for average yearly mileage of 300,000 miles per car compared with a companion train equipped with cast-iron shoes:

- COBRA Shoe life—38,095 miles per shoe
- Cast-iron shoe life—7500 miles per shoe
- Wheel life with COBRA Shoes—133,000 miles per turning
- Wheel life with cast-iron shoes—77,000 miles per turning

The excellent mileage of COBRA Shoes and the increase in wheel mileage between turnings, revealed dramatically by this train operation, produce these outstanding savings:

Yearly brake shoe savings per car $1088.00
***Yearly wheel savings per car . . . 666.00**
Total savings per car per year . . 1754.00

**Wheel savings based on wheel changes specified by Rules 21 and 22, and Rules 101 and 105, A.A.R. Code of Rule for interchanges of traffic, effective January 1, 1963.*



***Make this inexpensive test on any suburban or passenger train.* Equip an entire train with COBRA Shoes. Keep accurate records of brake-shoe costs and wheel-turning costs. Compare them with present costs. You'll find that COBRA Shoes are one of the best possible investments you can make for quick return and continuing savings.**

RAILROAD FRICTION PRODUCTS CORPORATION • Wilmerding, Pennsylvania

JOHNS-MANVILLE CORPORATION, Specialists in Friction Materials

ıry 424 is 58 ft 10 in. over pulling faces and 14 ft 11⅝ in. high. Fuel tank holds 2,000 gal. Unit weighs 256,000 lb.

-L Puts 'Century' Diesels in Service

'he first three of the Erie-Lacka- ına $3 million order for 15 Alco ntury 424" locomotives have gone service; the remaining 12 units currently being delivered. Their gnment: fast freight trains between rion, Ohio, and E-L eastern termi- in the New York metropolitan ı.

'he Century 424, one of three new ı-horsepower domestic models an- nced in February by Alco (RL&C, rch 1963, p 31), is a four-motor, r-axle unit with a 2,400-hp rating. er Century models are the Century —a four-axle, four-motor, 2,000- unit, and the Century 624—a six- :or, six-axle, 2,400-hp unit.

Vhen introduced, the Century se- was described by an Alco spokes- ı as having been designed to re- :e aging locomotives "with more ver at less cost than previous mod- " The 15 E-L units are to replace units of 1,350-hp rating which were into service in 1944.

'Although they will be doing bas- ly the same job," said M. G. Mc- es, E-L president, "the smaller nber of these high-horsepower lo- ıotives will enable us to operate ger distances with fewer terminal ıdlings and less servicing than with the older locomotives. The result should be increased dependability, improved on-time performance, and greater economies both in operating and maintenance costs. We expect the locomotives will pay for themselves in five years of operation.

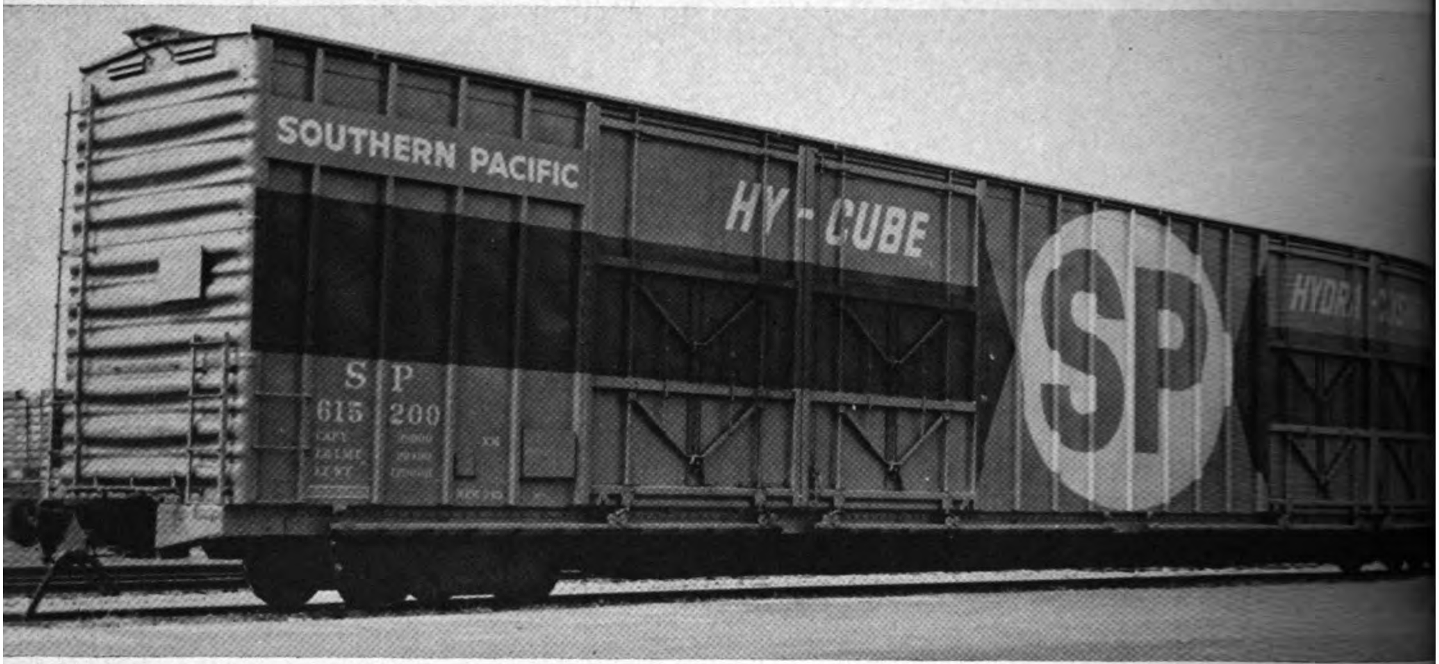
"Our purchase of the new Century locomotives marks the first addition to our motive-power fleet since the merger of the Erie and the Lackawanna in 1960," Mr. McInnes explained.

The Century units will be operated in m-u sets of three to provide 7,200 hp. E-L has been operating five of the 1,350-hp units to power trains of the same length. With a running time of about 22 hr between Marion and Jersey City, it is expected that the five three-unit locomotives will power two eastbound and two westbound trains daily, meaning that each unit will accumulate 18,000 to 20,000 miles monthly.

The Century 424 is powered by the 16-cylinder Alco 251 four-cycle, supercharged engine. This diesel has a 9-in. bore and 10½-in. stroke. Electrical equipment and the engine compartment are pressurized with air delivered by a fan through Dynavane filters. Cooling air is supplied to traction motors by a single blower, gear driven from the generator. In addition to the two Dynavane filters, a panel-bath filter gives secondary filtration for the engine combustion air. The sealed control compartment gives maximum protection to electrical contacts.

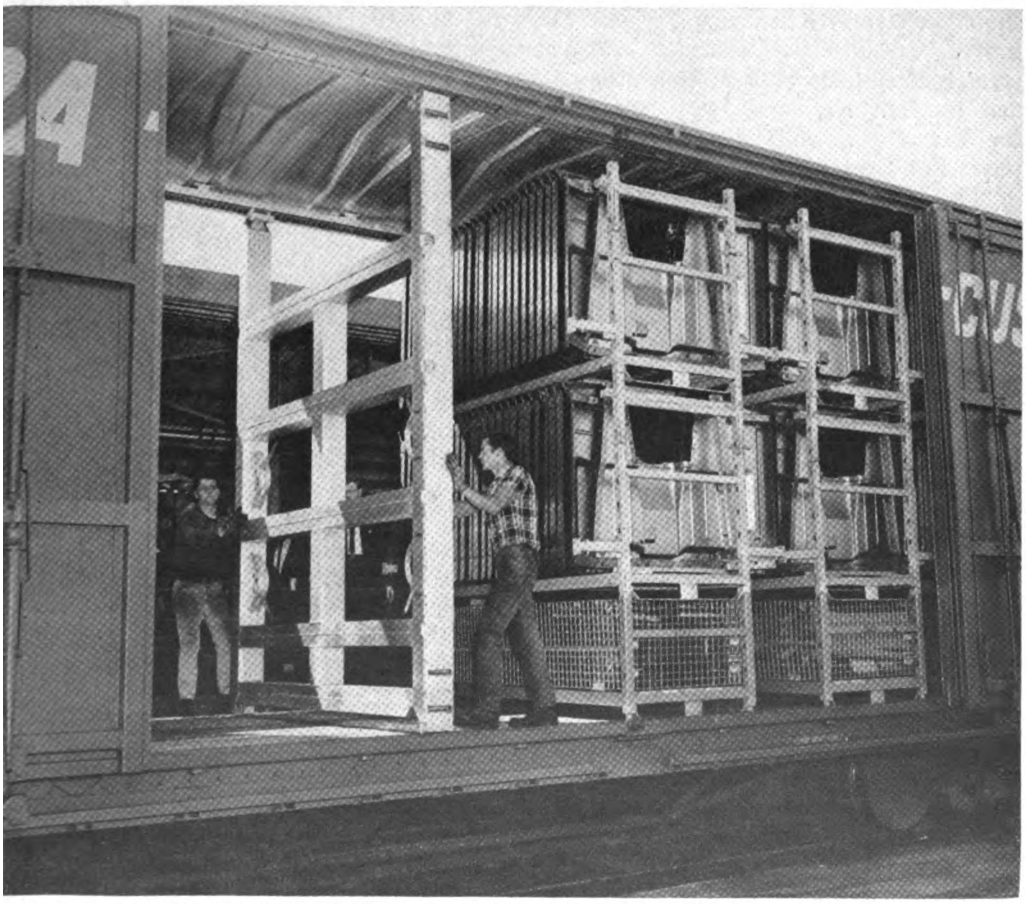
Doors on both sides of the hood have been arranged so that they can be folded back to expose the entire sides of the diesel engine. A hinged access hatch has been added to the top of the short front hood to simplify removal of auxiliary equipment located there. Radiator cores have been mounted horizontally to make them self-cleaning. The radiator fan has been mounted directly on top of the eddy-current clutch, eliminating the fan drive, shaft and upper bearing. The air compressor in the radiator compartment is direct-connected to the engine with a longer shaft to simplify alignment.

The lube-oil filter, strainer and cooler are mounted on a prefabricated module, reducing the amount of pressure piping and making it possible to remove the assembly through the hood doors. The low front hood and the V-shape windshield are designed to increase the field of vision for the engineman.



Double plug doors covering the two 20-ft openings on each side of the long car speed mechanized loading and unloading.

SP Builds 10,000-Cu Ft Car To Haul Auto Parts



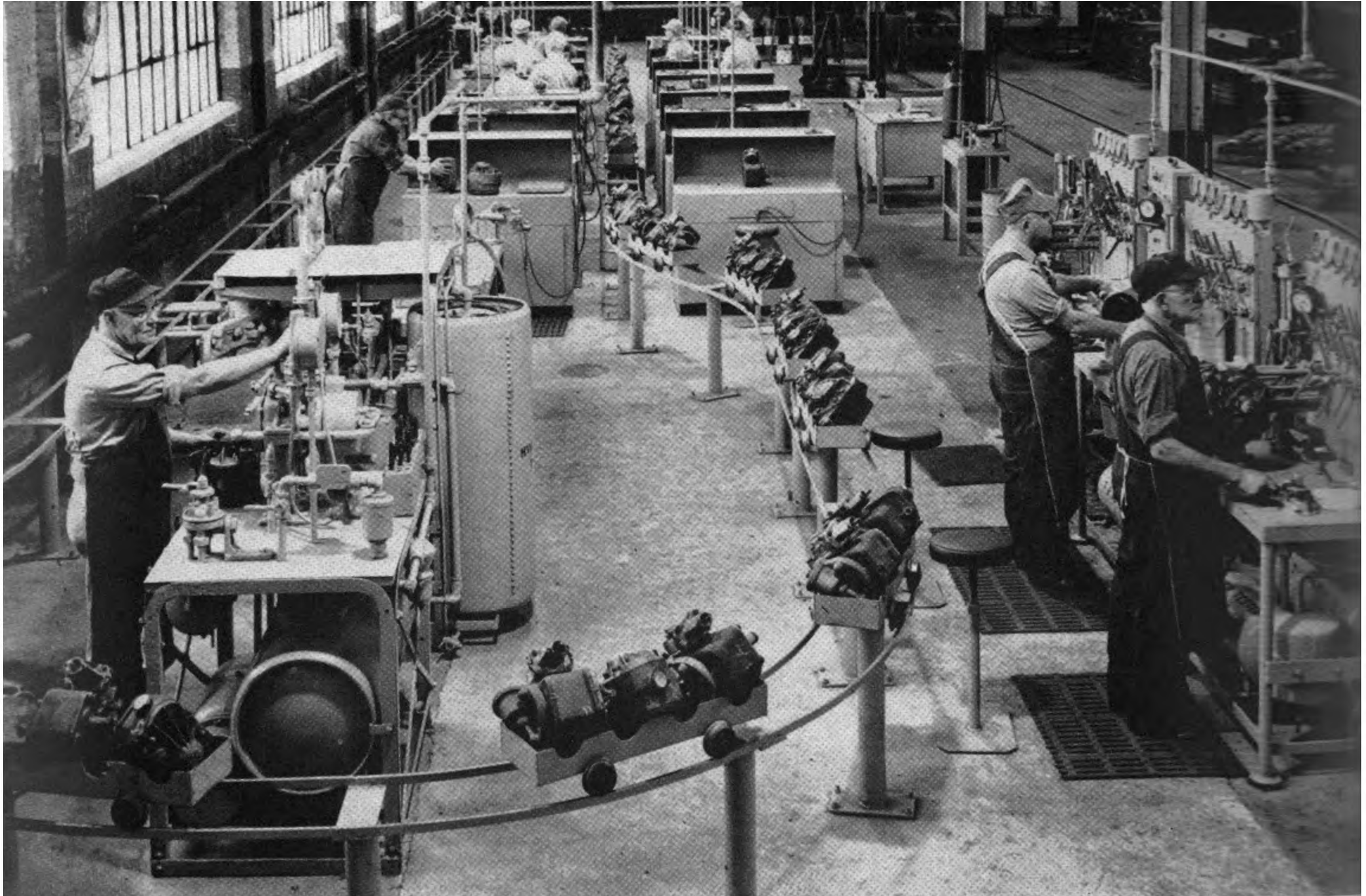
Movable aluminum bulkheads are used for securing the loaded racks in the car. Special racks and containers hold automobile components bound for assembly plants.

A 10,000-cu ft box car with pa double plug doors on each side just gone into experimental se handling auto parts into West C assembly plants. The Southern cific reports that the initial reve trip was completed with absolutel damage to the bulky, fragile p moved from Detroit to Oakland.

"The car was designed by SP chanical engineers and General tors material-handling specialists i effort to come up with a new car c able of handling large loads, w protecting the fragile auto compon involved," says W. G. Peoples, traffic vice president.

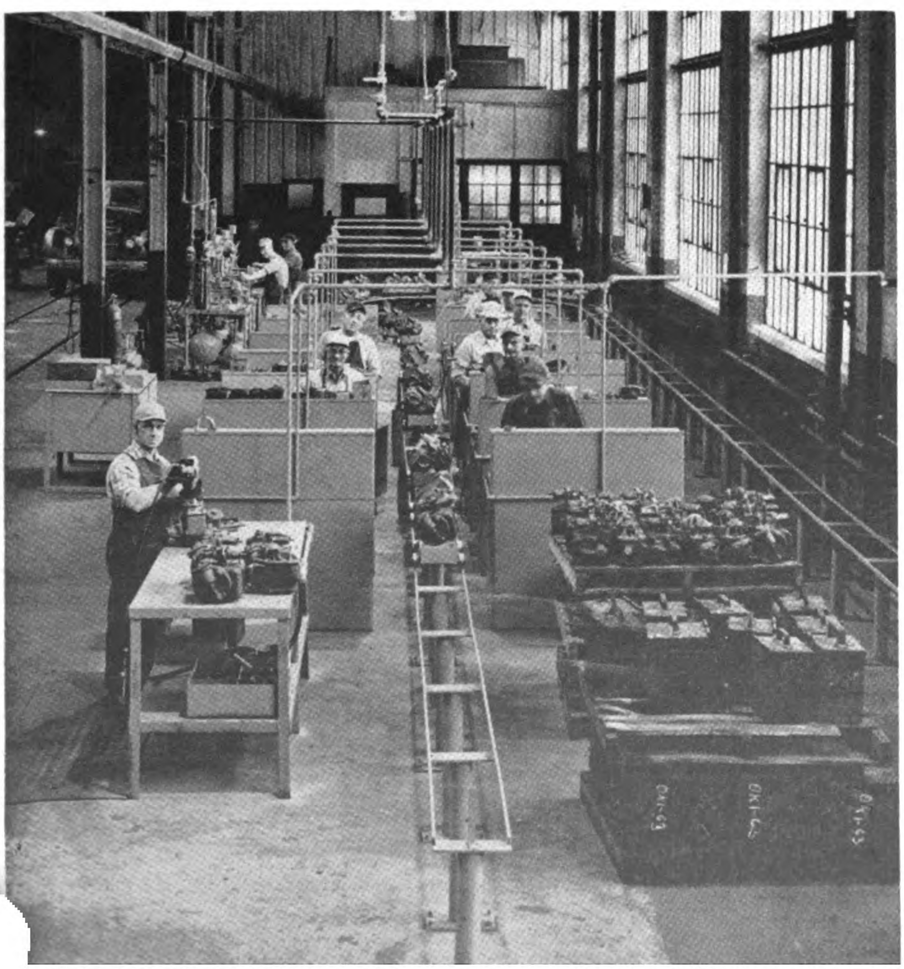
The car is equipped with a Hyd Cushion sliding sill having 20 travel. On each side are two 2 wide by 12-ft 6-in. high doorways. T carbody is a welded assembly w outside side stakes. Inside lengt 86 ft 5 in.; width, 9 ft 2 in.; hei 12 ft 8 in. The interior is fitted w movable aluminum bulkheads wh lock the racks and trays of parts place during shipment.

Light weight of the car is 120, lb. The load limit is 99,400 lb. Len between coupler pulling faces is 94 Overall height of the car is 17 ft ab the rail. Trucks are equipped with 3 in. wheels, composition brake sh and 70-ton roller bearings. SP and a filiated SLSW recently ordered 1, 50- and 60-ft Hydracushion box ca All these cars will be of 100-ton ca ity and 900 will be insulated.



Completely equipped work benches and necessary test racks flank the conveyor line. Line at left returns carriers for reuse.

Wabash Air Brake Shop Is Flexible



Portions are loaded in carriers for movemen through the line. Shipping containers loade with valves arrive in shop on pallets.

An overhaul line for all its freigh car and passenger-car brake equip ment has been established by the Wa bash in the car shop at Decatur, Il The production line, designed and in stalled by Wabash personnel, processe the following:

- AB-valve service and emergenc portions;
- D22-valve service and emer gency portions;
- Quick service, universal and L- triple valves for passenger cars;
- Brake-cylinder release valves;
- F1864 relay valves;
- Freight- and passenger-car brak cylinders;
- Single-car testing devices.

The production line works a one shift, five-day week with a norma force of 14 carmen.

"The new facility is designed wit the flexibility to meet various produc

(Continued on page 52)

› Freeze . . . or Not To Freeze

ˁen Wright

e past several weeks had been so
ıe that Pete had become particu-
sarcastic and disagreeable. Those
ˁnow and understand Pete realize
this always happens when his
presents him with no real chal-
s.

te was at the storehouse. "What
s place, an 'out' house?" he was
g. "All you ever say is that you're
of this' and 'out of that.' How
be expected to do any mainte-
ː if I can't get anything to main-
vith?"

ı his way back to the shop he had
led at everyone he met, includ-
ıe boss, Big Jim. Jim kidded him
t it being spring, saying that all
; coming out of hibernation were
:hy. A short time later Big Jim
: up to Pete and asked him to
one of the younger mechanics
a problem on a refrigerator car.
temperature was not being con-
:d properly. Even though Pete
:diately complained about his new
nment, Big Jim knew that Pete
ılly was very pleased to get such
ıuble-shooting job.

pon arrival at the car, Pete found
in a quandary. "What's your
ɔle?" he asked.

'his one has me completely baf-
Pete," said Red. It's a load of
ce which is supposed to be 35 deg.
ıally, it is running almost 50 deg
I can't put my finger on any-
ȝ. What in the world am I over-
ing?"

Vhere did you get your tempera-
reading? Was it shown on the
temperature indicator or by our
test instrument?"

Ɔn the car's temperature indicator,
. We can't open a sealed side door
to put a test-meter lead inside."

Vait a minute, Red," said Pete.
ıat have I always preached? Don't
entirely on any device which is
ıanently installed on a car. Vi-
ion, shock, and normal wear-and-
can make such units inaccurate,
ı though they are built for ruggedness. When a question arises about the actual temperature, a comparison should be made with a unit of known accuracy. A side door of this car does not have to be opened. Even on cars where this is necessary, we can get permission by contacting the freight traffic department. Of course, we shouldn't open the door any wider or leave it open any longer than necessary to insert a mercury thermometer or test lead.

"It is desirable to get the test instrument as close as possible to the sensing element of the car's own indicator to eliminate any variation in temperature at different locations. With the car you've got here it is relatively easy to check temperatures. We merely remove the car's temperature indicator and, with a small piece of tape, attach the test lead to car's sensing unit. We then replace the car's unit with the test lead attached. With this method, we are definitely reading the same air temperature."

Pete then asked what type of temperature control the car had. Red replied that it was an electronic device. "That's one thing that has me worried, Pete. Right now that control panel is set for 20 deg. If whatever I've been missing should correct itself, that lettuce will be frozen for sure. I didn't want to lower the setting any further."

"That's a good idea," Pete agreed. "You're positive that you didn't set the panel that low yourself?"

"No, Pete; I haven't done a thing but check by looking and feeling. Frankly, I didn't know what to do."

"That's a good trait, Red. Don't start twisting, pulling, pushing and generally lousing things up just to be 'doing something.' Take a little extra time to be sure of what you're doing before you make a move.

By this time Pete had verified the temperature-control panel setting, assuring himself that inexperience had not caused Red to read the dial incorrectly. They then checked the car's actual air temperature with the test device. It showed car's temperature indicator was reading correctly, proving that the lading space temperature was too high. This, then, meant that they must go further with their trouble shooting.

"Red, have you noticed that the system has not cycled on during all the time we've been out here?" asked Pete. "Do we really know whether it will actually operate? If the refrigeration and heating system can and will, then we will know that the temperature control panel is calling for cooling or heating. We can do this by jumpering the proper terminals on the control panel. Remember that this is 220-volt a-c, and that we must be more careful. This electronic panel has terminals marked 'H' and 'C' for 'Heating' and 'Cooling.' Then there is a common terminal marked 'X.' If we put a jumper across X and C, the system should go into the cooling cycle. Another type of panel which you will find on some cars is a magnetic-amplifier type. On it the terminals are marked 'Cool' and 'Heat' with two terminals for each."

Following this explanation, Pete jumpered the X and C terminals. The system immediately started to cool. This proved that there was nothing wrong with the electrical control system beyond the temperature control panel, and that the temperature control panel would be at fault. If the refrigeration system had been defective —out of refrigerant, or with a compressor, expansion valve, or solenoid valve which was not working properly —the system would have been running, either constantly or intermittently, or the circuit breakers would have tripped. Pete's check had proved that there was nothing wrong there.

"Gosh, Red, I hope we don't have to change that panel," said Pete, showing his concern. "We don't have a spare in stock. It would be necessary to change both the panel and the sensing probe because they are individually matched. It might be one of the vacuum tubes, but before we check them, let's try the dial."

When Pete unlocked the dial and started to turn it, he exclaimed "What goes on here? I believe I've found our trouble, Red. This knob is loose. Get me your Allen wrenches."

This proved to be the trouble. Because the set screw was loose, the knob and dial could be rotated a considerable amount without actually moving the setting mechanism. Pete very carefully reset the knob so that the set screw would be properly centered over

—

**ꞩ the twenty-first article in this series dis-
ıg the operation, maintenance and trouble-
ing of mechanical refrigerator cars and
ʳback trailers.**

the flat surface on the shaft. After he had completed this, the dial was indicating a setting of about 50 deg, showing that the car's temperature control equipment had been functioning in accordance with the real setting. Pete turned the knob down to 35 deg, and the refrigeration system went to work.

"Pete, are you lucky or what?" asked Red. "I don't think I would have ever found that. By the way, you posed another problem. What would I do about this vacuum tube checking. Who checks them and where?"

"In the shop you'll find a tube checker just like those in radio shops. It's relatively easy to use; just follow the instructions."

"Suppose I'm sent out on the road. Say I'm out at Little Cloud. What do I do there?"

"Take them to the radio shop up on the main street; they'll be glad to test them. If you need new tubes, they will have them. When testing, be sure no 'border line' tubes are reused. All the tubes in these temperature controls should be good strong ones."

At that moment Big Jim walked up to find Pete and Red apparently doing nothing. "Hey, come on you two! If the car is ready to go, let's get it released. It's a load you know."

"Hold on Jim; don't get in such a hurry. We aren't sure the temperature control is set properly."

Pete briefed Jim on what they had found. As they had actually reset the temperature control, the car's temperature could conceivably go below the setting of 35 deg. If that happened, only a 3-deg margin existed between freezing the lettuce and not freezing it. "We should wait, Jim, to see if the temperature is safe before we release it," explained Pete. "Red can keep an eye on it; he won't need me for that. I'll get back on my other job trying to make something out of nothing. Sure seems like we should have a few repair parts."

Jim grinned, knowing how Pete had really enjoyed this trouble-shooting session.

More 100-Ton Hoppers Are Coming

(Continued from page 40)

by their outside side stakes and by the double slope of their hopper floors.

The 100-ton Class H-13 could be no longer than the 85-ton H-11, so the height of sides has been increased by 2 ft to produce the larger cubic capacity. The hopper-door openings have been arranged to produce a maximum of area for lading discharge, meaning that the conventional single-door hoppers have been discarded in favor of the double-door design and that the three-hopper arrangement has become a four-hopper one.

The car has a conventional center-sill arrangement with this structural member topped by longitudinal hoods across the hopper openings.

Each body bolster is formed of a ¼-in. web plate reinforced by six vertical 4-in. I-beams extending between a ½-in. bottom cover plate and a specially formed 8- x 4- x ½-in. angle at the top which extends across the car between the bolster side posts and carries the six floor support beams which run from the top end angle to an angle atop the center sill. The three crossbearers are 14-in. wide-flange beams with top flanges shaped to support the stainless-steel crossridges which are welded on their tops.

The slope floor surfaces of the car are ⅛-in. stainless steel which has been found to be so smooth that lading will not hang up, making possible the rapid unloading which integral train operation envisages. The sides of the car are $^{3}/_{16}$-in. low-alloy, high-tensile steel, and the hopper sides are $^{5}/_{16}$-in. LAHT material. The side angle is a 5- x 3½- x ⅜-in. angle, and the top chord is a bulb angle of the same dimensions. The twelve intermediate posts on each side of the car are pressed hat sections, 4½ in. deep. Side posts at bolsters and crossbearers are heavier sections of the same configuration. The entire car side is welded, but is attached to the side angle with rivets as well as welds, as the case with the bolster and crossbearer side-post connections. The sides are tied together with three tubular ties, located above the crossbearers and centered 13¾ in. below the top of the car side.

The car has conventional 100-ton trucks with 6½- x 12-in. roller bearings, 2½-in. travel springs, and 36-in. multiple-wear steel wheels. The light weight of the car, 63,000 lb. is such that no empty-load brake is required. However, the car is fitted with package brake assemblies.

Wabash Brake S

(Continued from page 50

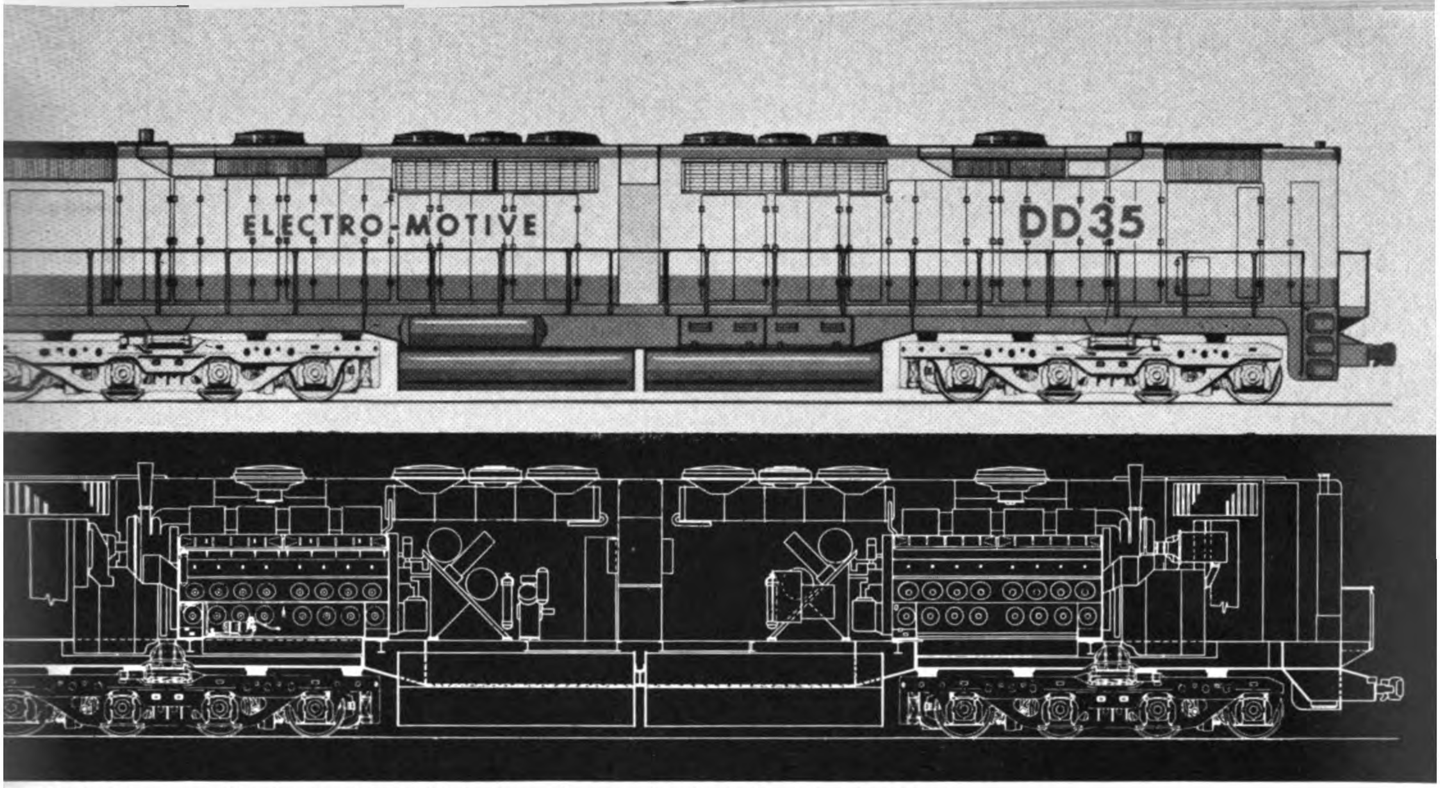
tion schedules," said Earl E Wabash superintendent of car ment. "It features mercury lighting and fully equipped benches, providing improved conditions for employees. improvements are being m mechanize line operations. O feature, recently designed and led, is an air-operated device simplifies the dismantling of cylinders which have come cleaning and lubrication. The eliminates manual labor previ quired to compress the spring

Air-brake components remo repair at outside points are shi Decatur in metal containe moved into the repair shop lift.

All steps in the overhaul are venient to a pair of parallel ele conveyor tracks on which fla wheel carriers are used to mov valve portions through the line. disassembly of AB emergency service portions is done at one at the head of the line. The port are then placed in the carriers move between seven-in-line ben on each side of the conveyor where complete disassembly, clea and repair is done. Each bench equipped with special solvents, cleaning, and all gauges such as for determining piston-ring repl ment and bushing and slide-v wear.

From the repair area, the car containing the AB valve portions moved by hand to three test ra Those that pass the test racks re on the conveyor track next to building wall to the head of the for shipment. Rejected valves re on the same track to the disasse benches for rework. These valves marked with chalk to indicate the ture of the defects. Abbreviati such as "R" for ring leakage, "S slide-valve leakage, and "V" for valve defects are used. After the fects are corrected, the valves are turned to the test racks for recheck.

Passenger equipment requiring special test rack—the UC, univer control, equipment; older type valves; and single-car testing dev —are disassembled, repaired and ed at benches opposite the three valve-test racks.



is 87 ft 11 in. over pulling faces and 15 ft 9¾ in. from rail to top of stack. Fuel tanks hold 5,200 gal.

M To Build 5,000-Hp Diesel Electric

Two-engine booster unit and the 2,500-hp GP-35 will be powered with new 900-rpm 567-D3A diesel

new high-horsepower diesel-ric freight locomotives have been ›unced by General Motors. In ‡ GM's Electro-Motive Division begin production of the 5,000-hp :35, a booster unit with two en-s and two four-axle trucks. Sched- to go into production in October ıe 2,500-hp GP-35, a single-en-unit basically similar to the 2,250-ЗP-30 which EMD has been pro-ng since 1961 (RL&C, November 1, p 17). Prime movers for these s will be the 900-rpm 563-D3A ne. Prototypes of both locomo-s will be on exhibition at the Amer- Railway Progress Exposition in cago in October.

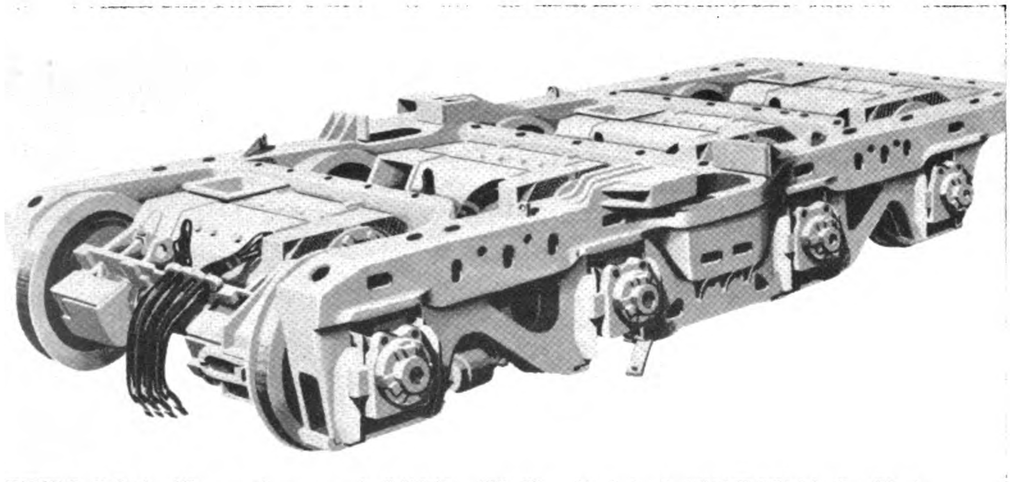
These locomotives are designed to vide U.S. railroads with greater lo-ıotive performance and operating nomy in multi-unit consists," R.L. rell, GM vice president and EMD eral manager, explained in an-ıncing the new models. "The cab- DD-35 brings a new dimension to unit principle in motive power ch was pioneered by EMD in the l-30's. It operates solely as a ›ster unit to provide a big unit-reducing block of 5,000 hp for meeting high horsepower requirements of railroads operating increasingly heavier trains at high speeds. For example, one DD-35 coupled to one GP-35 would replace five 1,500-hp freight units." The DD-35 is equipped with eight driving axles in two identical, four-axle, fully flexible trucks which can utilize the high horsepower over a wide speed range while limiting axle loading so that the 488,000-lb unit can be accommodated by existing track structures. The four-axle trucks use the Flexicoil suspension system developed by EMD for the three-axle trucks used in the SD-9, SD-18 and SD-24 locomotives.

Four-Axle Truck

The body load is transmitted to a swivel-bolster through a conventional center-plate arrangement. The bolster load is transferred to the truck frame through a set of coil springs under each end of the bolster. The coil springs are widely spaced transversely to assure rolling stability of the body. The DD-35 is designed to operate not only with the GP-35 lead unit but with existing locomotives in railroad motive-power pools.

The GP-35, at 56 ft 2 in. and ballasted to 260,000 lb, duplicates the GP-30 in length and weight. The over-all height at the exhaust stack is 15 ft 3 in. Height at top of the roof line is 14 ft 4 in., 8 in lower than the GP-30. It then slopes to a new low profile which provides additional clearance for tunnel operation and gives greater latitude in locating horns and radio antennas.

Compared with previous models, the GP-35 and DD-35 locomotives incorporate improvements in prime mover, electrical transmission and control apparatus. The improvements are applicable to earlier GM units. The 2,500-hp is achieved by having the new 567-D3A engine operate at 900 rpm instead of 835 rpm, full load speed for the earlier 567-D and 567-C models. Other engine features include a newly designed piston, an improved cylinder head, changes in the turbo-charger and improved engine air filtration. The new locomotives also have a completely new transmis-



Four-axle truck for DD-35 uses suspension developed for six-axle truck on SD locomotives.

sion composed of the D-32 main generator and D-67 traction motors. While overall dimensions of these electrical components are unchanged from earlier models, their ratings are considerably higher.

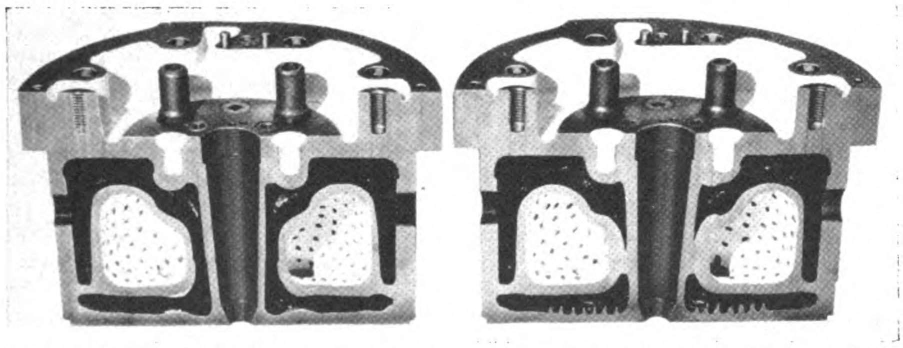
The new piston in the 567-D3A engine employs an alternate heat-flow principle to reduce operating temperature and relieve crown stresses. From crown to platform support it has 24 wide vertical struts with three times as much metal as the eight struts in the old piston. This gives additional strength as well as additional paths for transferring heat from the piston's firing face.

In the new cylinder head water passages directly above the firing deck have been reduced in size by providing "spines" around the valve and injector openings. The reduction in cross-sectional area increases water flow velocity, causing the head to run cooler.

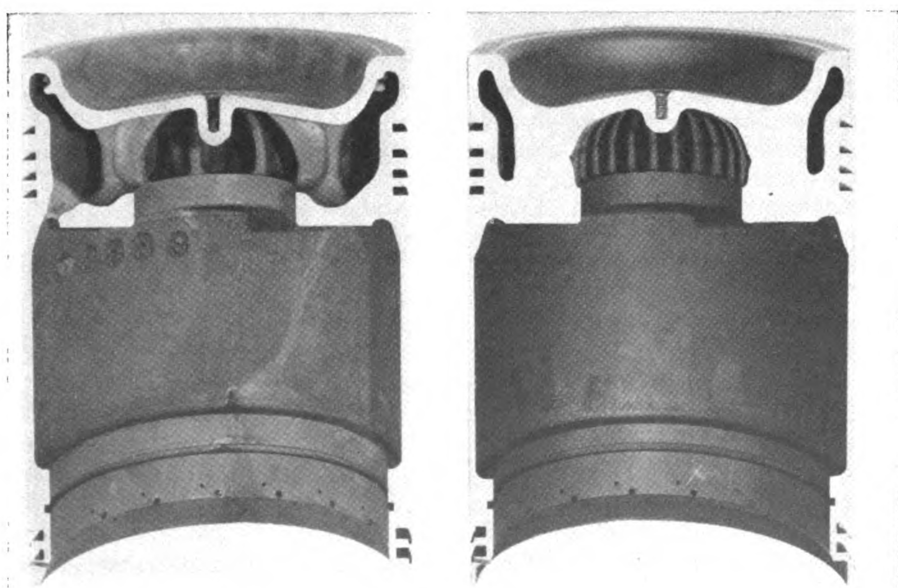
Turbocharger

The turbocharger for the 567-D3A engine has a 4½-in. outside diameter thrust bearing which can carry a better oil film. It also has a new design of blading, an 18:1 gear ratio, and a screen at its inlet to protect turbine blades against damage from foreign objects. The low-water and crankcase-protection device, designed by EMD, automatically shuts the engine down through the governor when there is a lack of engine coolant, or when there is a change from negative to positive crankcase pressure which could be caused by an engine part failure. A new inertial type engine air filter replaces existing devices, raising efficiency and using less power for its operation.

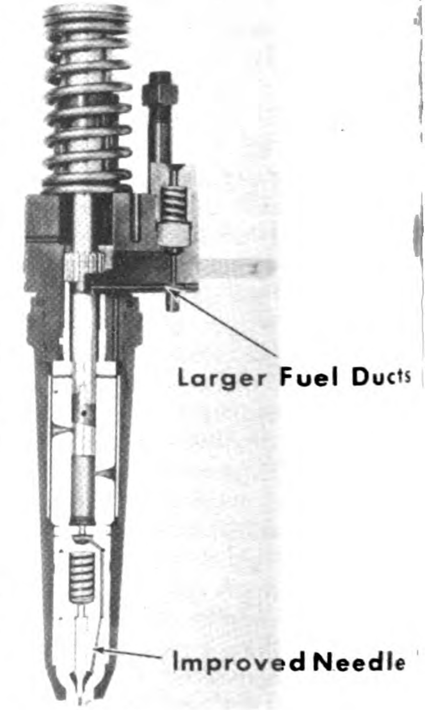
The D67 traction motor has a rating of 625 hp. By reducing eddy current losses, split conductors in the armature



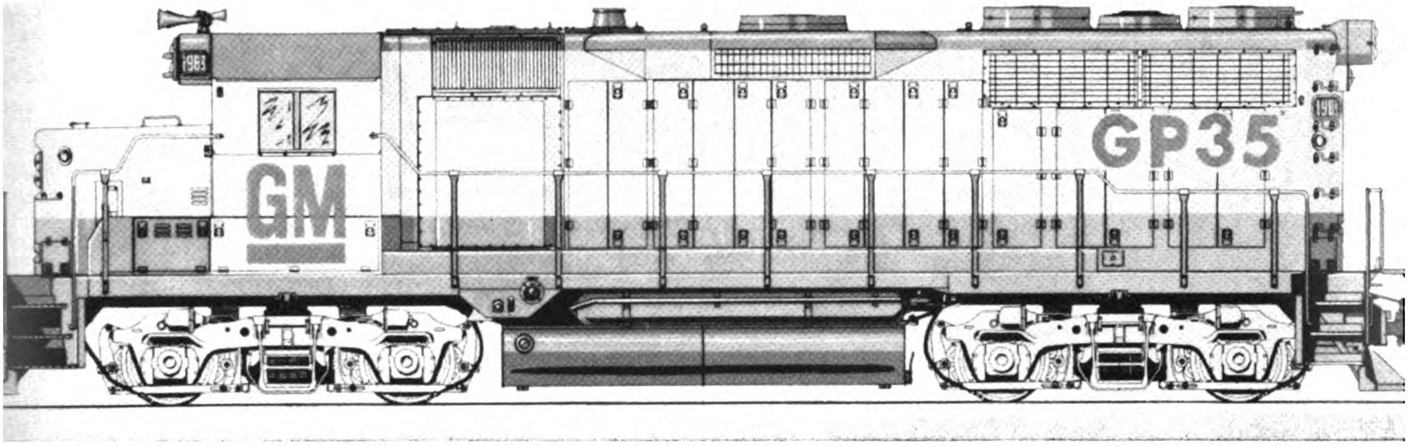
New cylinder head (right) has spines cast in water passages above firing deck and around injector well to improve heat transfer. Previous standard head (left) has lower water velocity.



Piston for 2,500-hp engine (right) has same 8½-in. diameter and 10-in. stroke of earlier models (left). There are now 24 struts under crown instead of previous eight.



Larger passages and redesigned needle deliver larger quantities of fuel now required.



ıe of GP-35 is lower than that of GP-30. Other dimensions—including overall length, truck centers and wheel base—are the same.

possible a current rating of amp at 357 kw. A new mois-roof insulating material with dielectric properties is used d the coil straps. This high-rature insulation, along with vedges in the armature and new banding techniques, improves lissipation, also contributing to sed capacity without raising the ting temperature of the arma-

ısh holder frames have been re-ıed to eliminate differential wear en brushes. By cutting down the face of the brush pocket to ac-ıodate a $2\frac{3}{8}$-in. brush, EMD re- that it is possible to increase .ble carbon and reduce mainte- by extending periods between replacements.

plications of nylon grease-re-g inserts in the inner cap of the ıutator end and in the outer cap of the pinion end cover are designed to prevent grease loss. A manganese steel wear plate on the motor nose support will lengthen service life.

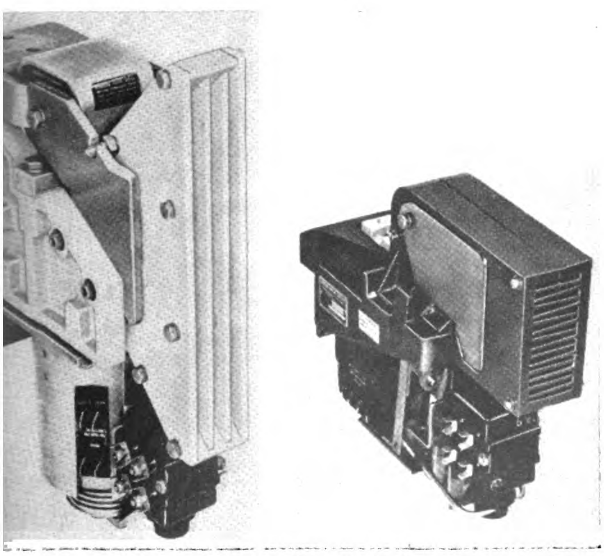
Main Generator

In the D-32 main generator improved armature insulation gives better dielectric and mechanical properties. This, plus additional air supply, permits the necessary increase in current rating without higher operating temperatures. Complete redesign of the stator's internal connections has eliminated external bus bars.

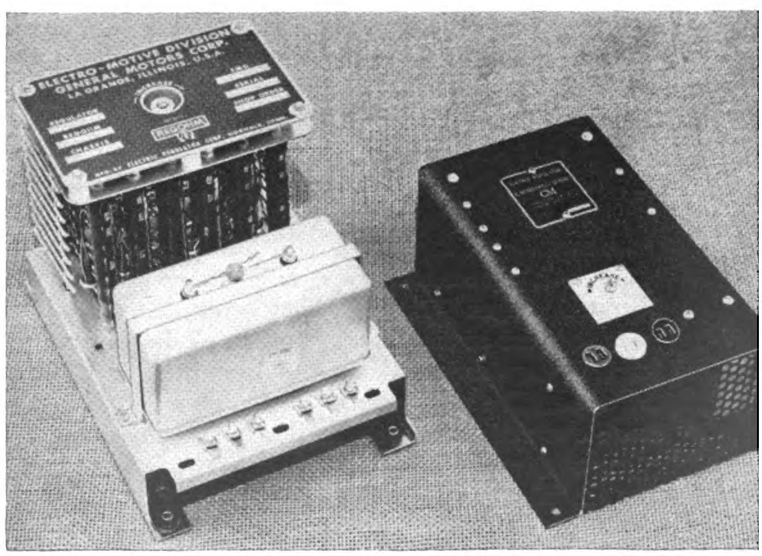
The generator's redesigned brush holder has five constant-pressure spring holders to reduce brush wear. This spring holder, made of non-tracking polyester glass, has two constant-pressure stainless-steel springs which exert 3.2 lb force on each brush. New $\frac{27}{32}$-in. brushes also increase capacity and lengthen maintenance intervals.

The static voltage regulator has eliminated all moving parts except one relay used in starting the engine. The EMD power-control feature permits GP-35 and DD-35 locomotives to work in m-u with existing motive power without sacrificing performance of the new units. This control allows maximum permissible horsepower and tractive effort to be exerted while starting and accelerating heavy trains. New power contactors, shunting contactors, and reversers are all installed in a high-voltage cabinet somewhat lower than that previously used. In both the GP-35 and DD-35 the roof hatches are designed to simplify removal of major power-plant, transmission and control components.

Dynamic braking on the GP-35 and DD-35 has greater capacity in the low-speed range. It is controlled by a transistorized regulator.

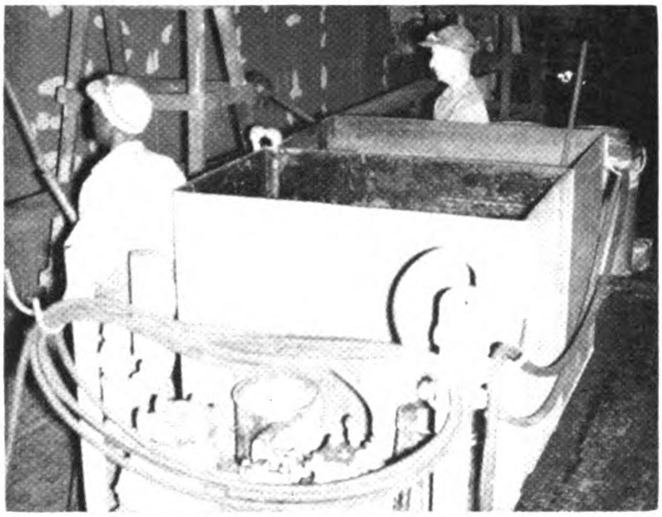


contactor (right) used on GP-35 and DD-35 is smaller than con-ıal model (left). Cabinet housing them is also smaller.



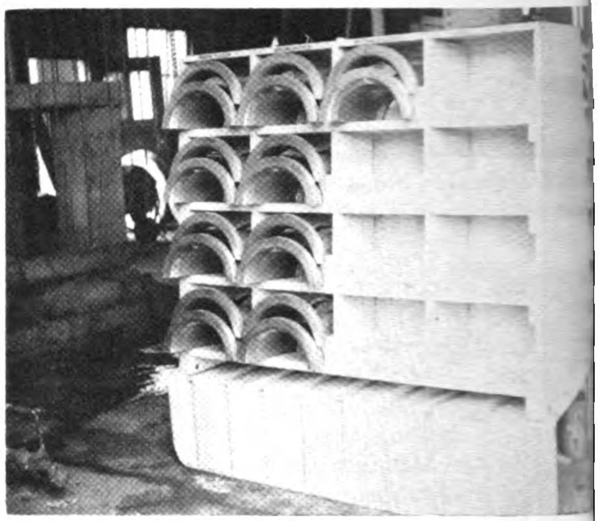
Static voltage regulator (right) takes place of previous standard (left). It has only one moving part—an engine-starting relay.

Hood Cleaning



Twin skid-mounted tanks with steam heating coils in the bottoms contain a chemical cleaner and clear rinse water for cleaning locomotive hoods prior to painting at the Illinois Central Paduch, Ky., diesel shop. A cut-out valve in the high-pressure pump connected to both tanks permits independent operation. The hoods are cleaned and brushed after application of cleaning solution, then sprayed and brushed with water.

Bearing Storage

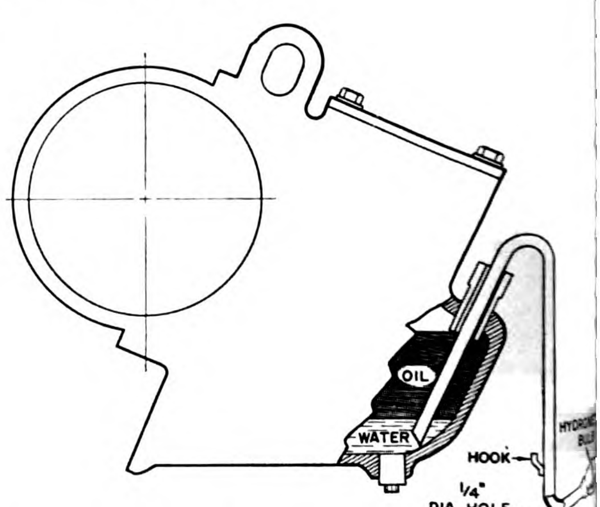


The Milwaukee uses these skid-mounted wooden made racks at its Milwaukee, Wis., shops to store motor support bearings. The two halves are kept by the stepped sides of each compartment. Sizes 8¼-in., new, 1/32-in. and 1/16-in. oversize for power. For freight power, the racks hold 8-in. new ings, 8-in. reclaimed, and 1/32-in., 1/16-in., 3/32-in. and in. oversizes.

Draining Support-Bearing Housings

A syphon for removing water from lubricating-oil reservoirs in traction-motor support bearing housings without disturbing the drain plug under the housing is in system-wide use on the Chicago & North Western. The device, made of ½-in. copper tubing and a hydrometer bulb, has a 10-in portion that extends down through the filler cap and is cut on an angle at the end to prevent plugging when inserted to the bottom of the housing. In the bottom of the 45-deg bend at the end of the vertical portion of the tube leading to the hydrometer bulb, a ¼-in. hole is drilled.

After the syphon is positioned for removal of water, the bulb is squeezed and the drain hole closed by the operator's finger. When the bulb is released, any water in the bottom of the oil compartment is drawn into the tube. Syphon action is started by removing finger from the drain. The compartment is free of water when the flow slows and vacuum breaks due to viscosity of the oil. As a safety measure to prevent oily water from draining into the pits, a bail hook for supporting a container is placed on the side of the tubing. The device was developed by the road's electrical engineer, L. E. Legg, to minimize traction-motor failures due to insufficient lubrication, improper tightening of drain plugs, and failure to replace oil lost during the course of water in the conventional manner. Previously it was moved through the drain hole in the bottom of the bearing housing.



Hook on syphon's side allows bucket to be hung there to catch

What Is Your Problem?

ɪd in cooperation with the Locomotive Maintenance Officers Association, these are as practical—but not the only—solutions to current locomotive problems. Material piled by the LMOA "What Is Your Problem?" Committee under the chairmanship Dwyer, chief chemist, Chesapeake & Ohio. Along with problems and solutions submitted OA members, those sent to the Editor by other readers are welcomed and published.

mpressor Control

t are the merits of individual ompressor control versus synnized control?

idual air-compressor controls simple, reduced maintenance rouble-free operation. Main resr pressures are maintained as ed; air compressors are not overd; main reservoir safety valves ot popping continuously; piping aftercoolers are not damaged overheating. Synchronized concontinually give trouble with ciry and other component parts. causes burned-up air compres- piping damage, carbon forma- and safety valves blown apart damaged. Correction of this probs made with two pressure switches, for synchronizing system first ; the other, individual secondary rol. With any difficulty in No. 1 there will be protection and coron from the No. 2 individual con-

. Pruchnicki, supervisor locomomaintenance, Southern Pacific.

'mature Failure

at would cause the armature field of a D-27 traction motor individual blower to burn when the other three motors wed no signs of heat or over1? Traction-motor-blower fan OK and mileage on motor 38,000.

hout first-hand knowledge of all s connected with this motor fail- a recheck of all known conditions could contribute to such a failure eing submitted in the order of their bability.

First is loss of cooling air. This ld result from:

- Failure of traction-motor blower;
- Reversed traction-motor blower;
- Restriction of intake air resulting from a plugged intake air filter or screen;
- Defective air bellows between motor and carbody;
- Missing commutator inspection cover on the motor;
- Failure to remove top blanking cover from the motor at the time of its application to the diesel;
- Failure to remove masking paper from traction motor air outlet at pinion end of the motor.

The improper motor might have been applied to the locomotive. Look for the application of a D-27 motor with three D-47 motors on a diesel unit of 1,500 hp or less. Failure could also result if the D-27 motor were to be operated with three D-47 motors on a diesel unit having a rating of 1,750 hp or more.

A check should be made to detect defects in the electrical system of the motor frame:

- Main fields not properly set to brushholder neutral at time of their application to frame;
- Brushholder not properly quartered;
- Interpole coil shorted;
- Interpole coil reversed.

The armature electrical system should also be checked to detect possible defects. There could be a shorted equalizer circuit in the armature. Check for underspan or overspan of the equalizer coil when the armature was rewound. Look for shorted main armature coils between the top and bottom layers of the winding.

There could be defects in the magnetic system of the armature or field circuit. Look for:

- Excessive hysteresis loss due to rewinding on armature core having been subjected to excessive drag damage resulting from bearing failures;
- Excessive eddy current loss due to rewinding on lamination with punching insulation destroyed by excessive heating or vibration;
- Loss of proper air gap in frame from a loose main pole dragging on the lamination;
- Loss of equal air gap under main pole resulting from distortion of frame by such causes as welding.

If there was wheel-slip-relay action or an absence of any wheel-slip indication before the motor failure was noted, the following defects might have existed:

- Shorted turns in main field;
- One main field reversed;
- All main fields reversed;
- The F and FF leads shorted between the motor and reverser.

When an excessively overheated motor develops shortly after its application to a diesel, a recheck of the cooling air system will lead to the cause of the failure in 95% of the cases. If this does not disclose the trouble, a careful investigation of the electrical characteristics of the motor is in order.

C. J. Frey, electrical department foreman, Rock Island.

Magnetic Switching

What are the proper maintenance and repair procedures for nonpneumatic control equipment?

The Southern Pacific has had three years' experience with magnetic switch gear. About the only trouble encountered was burning of contactor tips on early model GP-9 units. The contactors involved were BKP-1 and BKP-2.

Experience with two-pole, doublethrow contactors used as reversers and braking contactors has, in general, been satisfactory except for locations where dust and sand prevail. In such environment, a high resistance surface gradually develops on the face of the contacts which, eventually, destroys the contacts through overheating. This condition has been corrected by sealing the contactors against the entry of dirt with molded rubber inserts which were furnished by EMD and installed in all openings.

We are at present following EMD Mechanical Maintenance Instructions. Because of the newness of this equipment and its apparent trouble-free operation, we have not at this time established any special repair procedures.

K. Pruchnicki, supervisor locomotive maintenance, Southern Pacific.

Report

(Continued from page 12)

that the designs of keys used in angle cocks not including the "O" ring seal, is such that the machining modifications necessary to include "O" ring seal cannot be made without seriously weakening the key. Modifications to old style keys to include the "O" ring sealed groove are not permitted.

Triple valve oil to meet AAR Specifications M-912-61 is currently being furnished by the American Oil Co. (Super Permalube 5W-20) and Cities Service Oil Co. The Mechanical Division has advised that, if and when other companies meet the specifications, member roads will be notified by circular letter.

Sliding Sill Affects Multiple-Car Load

A sliding-sill car—one of three flat cars moving a multiple-car load—was involved in damaged load securements recently. The AAR Mechanical Division has called attention to difficulties experienced with two bridge girders which rested on two cars with an idler car between them. The shipment was prepared according to Fig. 58, Sec 2 of Rules Governing Loading of Steel Products on Open Top Cars. The girder sections at one end rested on a flat car having a conventional underframe and, at the other, on a flat car with a Hydra-Cushion sliding center sill. The third car at the center had a conventional underframe.

Several securement failures were found prior to movement from originating terminal. Brace rods were broken at both ends of load. The pivoted bolster at the fixed end on the conventional underframe car was twisted horizontally about 30 deg from its original position. Vertical tie rods were bent and top tie clamps were shifted about 1½ in. The load center pin at the slotted end, on the Hydra-Cushion car, was pulled tightly against the end of the slot toward the rear face of the bolster. Wood struts were shifted from their original positions.

These conditions are believed due to use of the Hydra-Cushion car. As the carrying car at one end of the shipment, it permitted undesirable movement. The Mechanical Division considers it desirable for all roads to recognize and to notify shippers that only cars with conventional underframes should be used for multiple load shipments. This loading condition has been referred to the Committee on Loading Rules which may soon prohibit use of cars with sliding sills where the load is carried on two cars.

Another condition recently brought to the Division's attention has been the letter and sign plates attached to the multi-level auto rack cars which are loosening with the flexing of car superstructures. Member roads have advised that some have fallen off, damaging trains on adjacent tracks and road-side equipment such as switch stands. Car owners have been advised that they should provide better mounting methods and that all roads should establish programs for assuring careful inspections and for correcting insecure conditions when detected.

To clarify the extent of General Rule 1 of Section 1 of the Loading Rules for Open

p Cars, Paragraph (a) has been revised read:

'Rule 1. Inspection and Compliance.

) Cars must be inspected by the origi-:ing carrier either before they are placed · loading or at loading point to see that :y are fit for the loading involved and ıt they are in suitable condition to carry : load safely to destination.

"Shippers must observe the drawings and :cifications of an applicable figure where igure is involved, as well as all applica-: rules regulating the safe loading of ight as published herein; and must also ıpect shipments to see that they are prop-y and safely secured, and that all appli-ble details in Rules 1 to 20, inclusive, as :ll as all applicable figures, where figures : involved, have been complied with in cases, before shipments are tendered to rrier.

"Originating carriers must inspect ship-:nts after they are loaded to see that they : properly and safely secured, and that applicable details in Rules 1 to 21, in-ısive, as well as all applicable figures, ıere figures are involved, have been com-ied with in all cases."

leavy Cars Complicate ·enter-Plate Lubrication

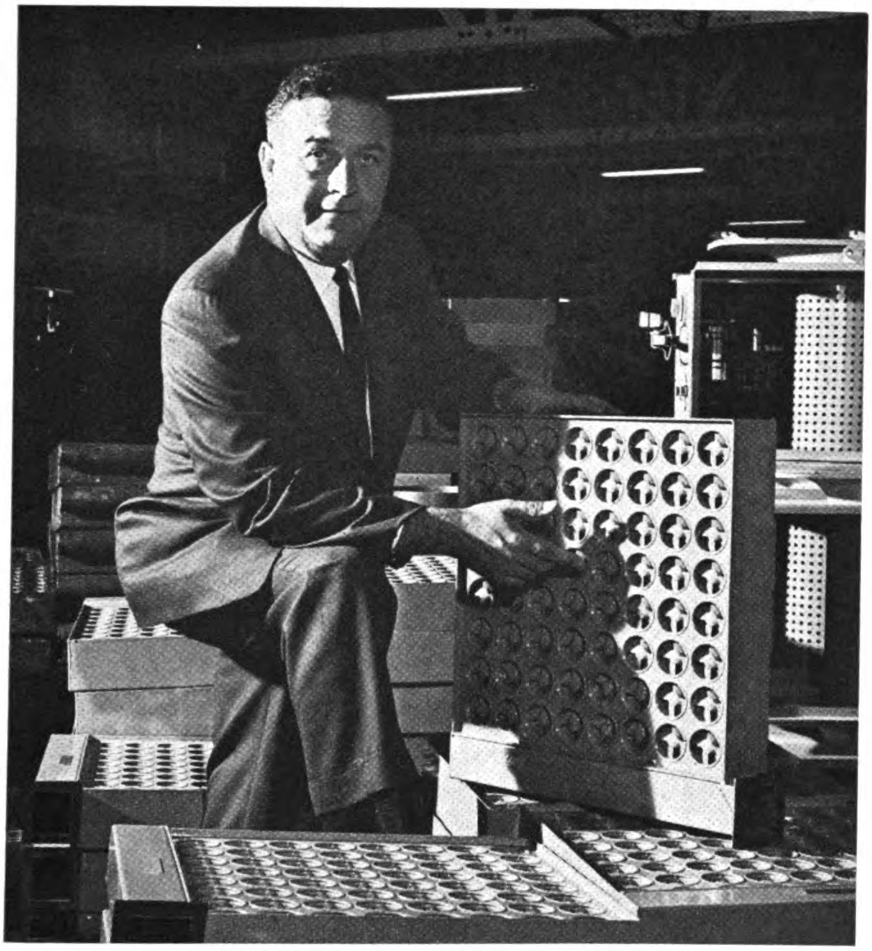
:nter-plate lubrication has became more itical with the heavier loads being carried the high-capacity freight cars that are ›w going into service. Dictated by eco-›mic factors, the current design trend is ›ward even larger cars so that the center ates have become the subjects of numer-ıs studies, both in the laboratory and with :rvice tests, a New York lubrication meet-ıg was told recently.

"Good swiveling of freight-car trucks is ısential if wheel and track wear is to be :pt within satisfactory limits," M. A. lanson, chief engineer, Magnus Metal orp., said in leading a panel discussion of :nter-plate lubrication at the annual tech-ical session of the National Railroad Lu-rication Council. Panel members were R. I. Pilcher, engineer of tests, Norfolk & Vestern; H. K. Lanning, mechanical assist-nt, Santa Fe; P. R. Broadley, mechanical-lectrical engineer, Central of New Jersey; Vayne Lasky, engineer of tests, Gulf, Mo-ile & Ohio, and W. K. Simpson, technical irector fuels and lubricants, Electro-Mo-ive Div., General Motors.

Service tests have included applications f lubricants such as graphite grease and nolybdenum disulphide, and the use of netal and plastic liners. Results indicated hat molybdenum disulphide produced bet-er lubrication than the standard grease in everal laboratory and service tests. Two ubricants currently showing promise are ›abbitt chips in graphite grease and lead hot mixed with grease.

Also under test is a laminated rubber andwich pinned to the truck bolster and he center plate which eliminates metal-to-netal contact (RL&C, June 1962, p 28). Truck swiveling is achieved by placing the ·ubber in shear. This test application was ·eported to have done a "good job" and ›hown "low torque characteristics." This rubber sandwich, as well as several lubri-:ants and liners, have been under continu-ing study in the AAR Research Laboratory.

Low-temperature performance of greases



in railway roller bearings was discussed John N. Crisp, mechanical engineer, W. E. Ellis, assistant chief engineer, Timk Roller Bearing Co. Laboratory tests we made with one barium and eight lith soap greases in 70-ton freight-car ro bearings under simulated service conditio at ambient temperatures ranging from to minus 55 deg F.

This investigation, considering only lithium base greases, showed:

• A change in the grease structure re sulting from its operation in a bearing adversely influence the torque characte istics;

• Slumping or circulating greases pr duce higher torque at low temperatu than those that assume a stable distribut without slumping in the bearing;

• Greases of harder consistency than AAR Specification M-917-56 greases do result in greater torque at low temperatu

• Greases having higher viscosity bases, in general, produce higher torq characteristics at low temperature.

Stresses in Diesel Wheels

Mechanical Research Report No. MR-4 now available, covers Stresses in Diesel Lo comotive Wheels Resulting from Bra Shoe Heating. The braking tests were co ducted on the brake shoe and wheel te machine at the AAR Research Cent Types of tests made were stop tests. T wheel was driven to a pre-determined spe the driving motor shut off and a pre termined brake application made until wheel stopped. Copies of the report may obtained from the secretary, AAR Mecha cal Division, 59 E. Van Buren st., Chica 5. Cost, to member roads, $1.00; to oth than member roads, $2.00.

Freight-Car Orders Up 65% in Four Months

Freight-car orders, up 65% through the fir four months of 1963, probably will mai tain this brisk pace at least through th year's first half. Preliminary May 1963 fig ures indicate that railroads were orderi new cars at a rate comparable with the sam month a year earlier. There are prospec that several more large orders could be an nounced soon.

The 3,755 cars ordered in April 196 compare with 2,452 in April 1962, accord ing to latest figures of the American Rai way Car Institute. The orders for 1963 first four months totaled 17,875 cars, com pared with 10,812 for the correspondin 1962 period. Backlog on May 1, 1963, wa 19,872 as compared with 14,244 a yea earlier. In the 1963 backlog were 10,40 cars on order with commercial car-builder and 9,471 with railroad and car-line shops Order backlog for box cars was the highes —6,715. Following this were unfilled or ders for 4,030 refrigerator cars; 2,869 hop per cars; 2,060 covered hoppers; 1,763 tan cars; 1,559 flat cars; 300 stock cars; 80 ca booses; 15 gondolas. Other types of cars o order totaled 481. Freight-car orders fo 1962 totaled 37,356, an increase of 6,66 over the total for 1961. Approximate 36% of the cars ordered in 1962 wer scheduled to be built in railroad and ca line shops.

Personal Mention

ıadian National.—*Toronto, Ont.:* GEORGE ƷALLOWAY, assistant general superintend- of equipment, retired.

ton Belt.—*Pine Bluff, Ark.:* M. P. NUN- .LY, engineer of motive power, retired. C. SCHEU, chief clerk, mechanical depart- nt, appointed assistant to superintendent chanical department.

-Lackawanna.—*Hoboken, N.J.:* T. E. SZALEC appointed division car foreman, boken and Jersey City Passenger Car. *quehanna, Pa.:* M. J. FEDORKA appointed ervisor car repairs, Hornell and east, h direct supervision over Susquehanna ch shop.

ınd Trunk Western.—*Battle Creek, Mich.:* D. GIBSON appointed mechanical engi- r. Formerly work study officer, CN nsportation department, Montreal. *Port ron, Mich.:* W. G. HURLEY, gang fore- n, car shops, appointed departmental eman.

waukee Road.—*Chicago, Ill.:* D. O. BURKE pointed assistant general manager, operat- ;, mechanical and engineering depart- nts.

non.—*Chicago, Ill.:* W. N. MITCHELL, as- tant superintendent—transportation, ap- inted mechanical superintendent, mainte- nce of equipment.

w York City Transit Authority.—*Brooklyn, Y.:* WALTER J. FULTON appointed assist- t general superintendent in charge of cars d shops department. Mr. Fulton formerly perintendent of equipment, Lake Region, nnsylvania.

ckel Plate.—*Fort Wayne, Ind.:* H. C. SUM- ERS appointed general car foreman. WIL- AM FISHER appointed assistant road fore- ın of engines. *Gambrinus, Ohio:* CHARLES CARR appointed enginehouse foreman.

ırfolk & Western.—*Roanoke, Va.:* GEORGE STRONG appointed chief air-brake inspec- r. Formerly master mechanic, New River vision, Princeton, W.Va. *Princeton:* OBERT G. BENNETT, JR., shop superin- ndent, appointed master mechanic. G. HAMILTON appointed assistant foreman, oanoke shops, succeeding RAYMOND E. UNDLEY, retired. RAYMOND R. FORBES, pervisory gang leader, appointed gang reman, Shaffers Crossing shop, succeed- g Mr. Hamilton. *Portsmouth, Ohio:* T. L. ILLER, shop inspector, appointed gang reman, succeeding WILLIAM J. CRAW- ORD, now powerhouse foreman. *Bristol, a.:* EDWARD G. BEATTIE, appointed general reman, succeeding G. E. WHITMORE, JR., tired. WILLIAM G. JACKSON appointed ıng foreman, car department. Formerly ıng foreman at Lamberts Point, Va.

ichmond, Fredericksburg & Potomac.— *Rich- ond, Va.:* FLOYD F. LANE, acting car fore- ıan, Car Department, appointed foreman ır inspectors, Broad Street Station.

Santa Fe.—*Amarillo, Tex.:* J. D. SWAUGER appointed to new position of general master mechanic. Mr. Swauger formerly superintendent of shops at Argentine, Kan. *La Junta, Colo.:* J. T. SMITH appointed master mechanic. Formerly master mechanic at Amarillo. *Clovis, N.M.:* JOHN L. FERTIG, master mechanic, retired.

Seaboard.—*Jacksonville, Fla.:* F. L. LATHAM appointed general air brake instructor, succeeding A. S. GREGSON, retired.

Southern.—*Alexandria, Va.:* OLIVER H. DUNCAN named general diesel supervisor. Formerly general foreman diesels, Knoxville, Tenn.

Southern Pacific.—*Houston, Tex.:* J. T. MCKENNA appointed superintendent of shops. *Ogden, Utah:* W. R. CALLANTINE appointed road foreman of engines.

OBITUARY

Emil C. Anderson, 88, retired mechanical engineer, Burlington, died March 25 at Collinsville, Ill.

Edred B. Hall, Sr., 92, retired chief mechanical officer, Chicago & North Western, died March 30 at Pasadena, Calif.

W. S. R. Hamilton, retired engineer of electrical equipment, New York Central, died recently.

Supply Trade

CLEVELAND GRAPHITE BRONZE, division of Clevite Corp.—Following agencies appointed representatives, responsible for direct sale to railroads of replacement engine bearings for engines and Clevite's journal bearing cartridge for freight cars: *Leo F. Duffy & Associates,* Chicago; *Frank B. Nugent Co.,* St. Paul, Minn.; *Consolidated Equipment Co., Ltd.,* Montreal, Canada; *McLean & Son,* Wynnewood, Pa.; *W. R. Pittman & Associates,* Fullerton, Calif.; *T. F. Going,* Louisville, Ky.; *Sam Goodloe* and *Goodloe Saunders,* Richmond, Va.; *Carriers Supply Co.,* St. Louis, Mo.

CITIES SERVICE OIL CO.—*Herman Bode,* formerly chief chemist, Research Department, Baltimore & Ohio, has joined Railway Sales department of Cities Service at Baltimore, Md.

UNION RAILWAY EQUIPMENT CO.—*John R. Sinding,* John R. Sinding Co., Wynnewood, Pa., named sales representative, Philadelphia, New York, and Washington, D.C., territory.

PAXTON-MITCHELL CO.—*Christian H. Petersen,* sales manager, named vice president of marketing.

BUCKEYE STEEL CASTINGS CO.—Eastern office moved from New York to 123 Quimby st., Westfield, N.J.

AIR REDUCTION SALES CO.—*H. Westendarp, Jr.,* appointed assistant reg[ional] sales manager, eastern region.

PANGBORN CORP.— Pangborn Co[rp.], Hagerstown, Md., has become a subsid[iary] of *Carborundum Co.,* Niagara Falls, N.Y.

KEYSTONE RAILWAY EQUIPMEN[T] CO.—*Harry M. Wood* named exec[utive] vice president. Mr. Wood formerly as[sis]tant chief mechanical officer — car, Pen[n]sylvania.

ENTERPRISE RAILWAY EQUIPMEN[T] CO.—*William Gibson* named assistant v[ice] president—engineering.

WESTERN RAILWAY EQUIPMEN[T] CO.; RAILWAY DEVICES CO.—M[ain] offices moved from St. Louis to Chica[go] Heights, Ill.

VAPOR CORP.—*Arthur J. Loose,* exec[u]tive vice president, elected president, su[c]ceeding *Alexander D. Bruce,* now chairma[n] of the board and chief executive offic[er]. *Laurence H. Gillick,* formerly vice presi[]dent, now vice chairman of the board.

OSTER MANUFACTURING CO.—*Charles Amann* named president.

NORTH AMERICAN CAR CORP.—*R[ob]ert E. Hallberg* elected vice president a[nd] general manager of the Railroad Car Di[vi]sion. Mr. Hallberg formerly vice preside[nt] in charge of sales.

ATIONAL CRANE CORP. — *Harold ansel* is president, and *John Snodgrass,* ce-president and general sales manager of e National Crane Corp., organized at averly, Neb., to manufacture hydrauli-lly operated equipment, including truck ounted cranes.

TTSBURGH PLATE GLASS CO.—*hn A. Burke, Jr.,* appointed director of insportation finishes sales, coatings and sins division, succeeding *William T. irey,* retired.

ESTINGHOUSE AIR BRAKE CO.—ormer Mass Transit Services consolidated to WABCO Mass Transit Center. *Gene Schaefer,* formerly product manager—ass Transit, Union Switch & Signal Div., med director of the Center.

LECTRO-MOTIVE DIV., GENERAL MO-RS.—*Floyd H. Albert* named parts sales presentative, Southwestern Region.

RIME MANUFACTURING CO.—Fol-wing appointed sales representatives: *owman Supply Co.,* Cleveland; *John P. hadwick,* Alexandria, Va.; *C. F. Reedy,* . Augustine, Fla.

EARBORN CHEMICAL CO.—*John J. ock* appointed sales representative at Phoe-x, Ariz., and *Henry S. Hillinga,* sales presentative, Eastern District.

NARCO INDUSTRIES, INC.—Name of *nion Asbestos & Rubber Co.* changed to NARCO Industries, Inc.

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following page 64.)

37. CAR CLEANING. "Systems Offered by Pak-Mor That Can Be Modified or Adapted to Suit Your Operation and a Pictorial Presentation of the Operation of the Soo Line" are the subjects of the catalog of the Pak-Mor Refuse Collection Packer Bodies, Trailers and Systems catalog. Pak-Mor Manufacturing Co.

38. BATTERY MAINTENANCE. Revised Exide Manual on Lead-Acid Exide Batteries (Form 1982) covers "everything from the fundamental principles of storage-battery operation to installation, charging, general maintenance and repairs for batteries used in industrial material handling trucks and mine locomotives." Electric Storage Battery Co.

39. GAS REGULATORS. Form 55101 describes Linde R-5100 Series ultra-high-purity regulators and their use. Contains also flow charts and performance curves. Linde Co.

40. TRACKLESS TRACTORS. Construction details, application information, and specifications on Lincolnweld tractors for single or tandem submerged arc welding given in Bulletin 5200.6. Lincoln Electric.

41. PACKAGED STEAM BOILERS. Circ-U-Latic and Modulatic watertube boilers, Hi-R-Temp hot oil heaters and Va-Power separately fired steam superheaters described in Bulletin 4066. Kleen-Tube gas, oil, or combination fired hot water or 15 psi steam boiler, in sizes from 28 to 120 bhp, described in Bulletin 4068. Theory of operation of Va-Power Circ-U-Latic steam boilers, in sizes from 75 to 300 hp, 15 to 250 psig, described in Bulletin 5000. Vapor.

Advertisers Index

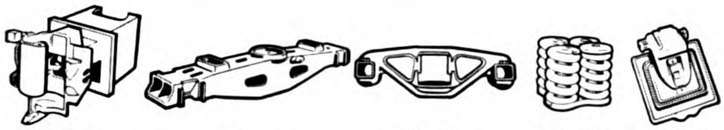
CHARLIE HUGHES
CASTING CHECKER
WITH SYMINGTON
FOR 18 YEARS

HE MAKES AS MANY AS 200 DIMENSIONAL CHECKS BEFORE GIVING THE GO-AHEAD FOR A PRODUCTION RUN

Symington's Charlie Hughes has the job of checking the sample casting before each production run to see if it meets dimensional requirements. On a big casting, such as a bolster, he may spend up to 8 hours, working with surface gages, calipers, scales and blueprints to verify as many as 200 individual dimensions. Whether or not a production run is started depends on his report.

A big responsibility—but one for which Charlie Hughes has had ideal training. Five years as an apprentice patternmaker (along with night school to learn mechanical drawing and blueprint reading); 12 years as a fully qualified patternmaker.

Highly skilled craftsmen like Charlie Hughes (whose father was a coremaker with Symington for 40 years) are the key to reliability in all Symington products. Despite increasingly sophisticated production tools, first-class workmanship still counts in terms of your operating and maintenance costs.



Couplers and striking castings · Bolsters · Side frames · Coil-snubber spring groups · Journal box lids

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AILWAY

ocomotives

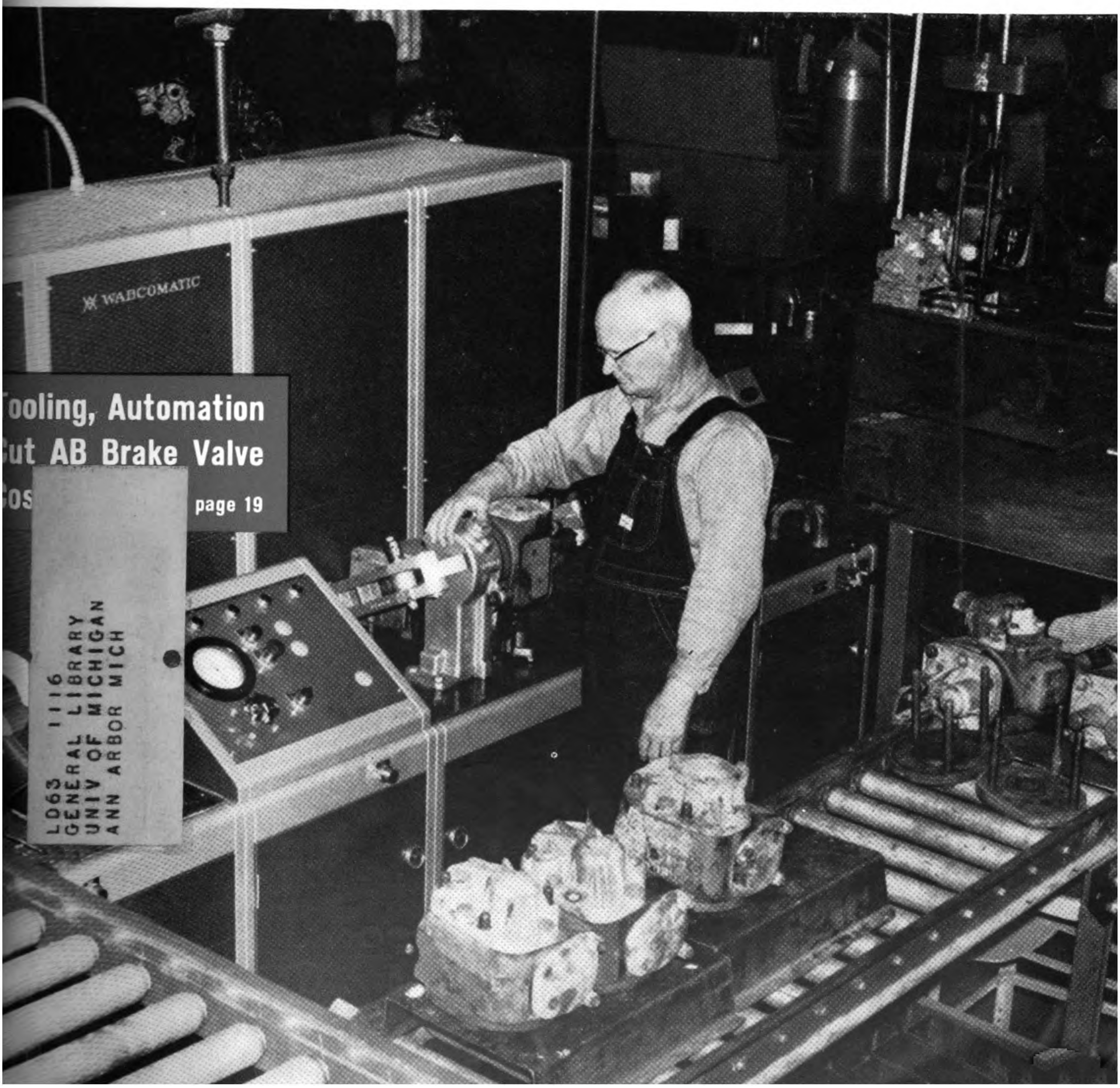
nd Cars

JULY 1963

AAR Mechanical Division Setting Higher Standards for Equipment

page 38

A Simmons-Boardman
TIME SAVER Publication

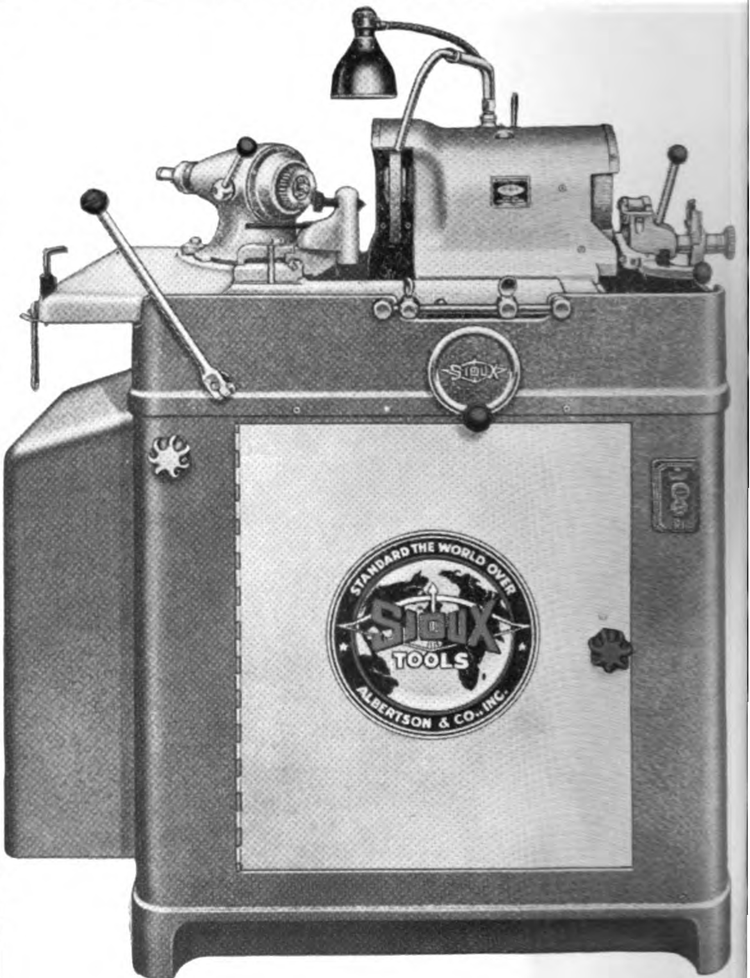


**ooling, Automation
ut AB Brake Valve
os**

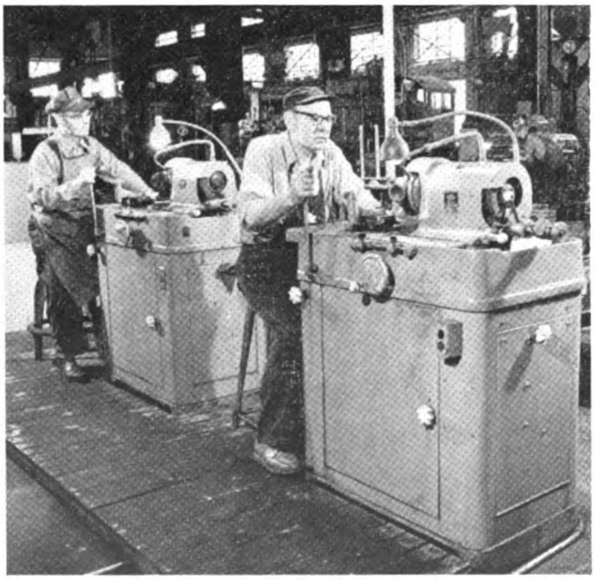
page 19

More SIOUX valve grinding machines are in use than all others combined!

Here is capacity to handle the largest valves. It's the SIOUX 682L Valve Face Grinding Machine. It will handle valve heads up to 6½″, valves up to 18″ long with aligner, and with no limitation when chuck bushings are removed. Its one horsepower motor does the job quickly with time savings of up to 25%. Users report that the valves refaced on this machine have a "better than brand new" finish. It achieves significant accuracy, maintaining seat concentricity closely on the largest valves.



TWO SIOUX 682L Valve Face Grinding Machines save time in C&NW shop



In this Chicago and Northwestern shop just outside Chicago, two SIOUX 682L Valve Face Grinding Machines are mounted in tandem. To save time, one machine is used for Electro-Motive valves . . . the other for Alco, Baldwin and Cummins engines.

SIOUX

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Locomotives and Cars

America's Oldest Trade Paper
July, 1963—Vol. 137, No. 7

ME SAVING IDEAS FOR JULY

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Report

Kendall To Be 'Coordinated' Speaker During ARP Exposition

W. H. Kendall, president of the Louisville & Nashville, is to be the speaker at the luncheon of the Coordinated Associations on Tuesday, October 15. The Coordinated groups—Air Brake, Car Department officers, Locomotive Maintenance Officers, Railway Fuel and Operating Officers Associations—are holding their annual meetings in conjunction with the American Railway Progress Exposition in Chicago, October 9 to 16.

The Exposition, featuring one of the most extensive exhibits of equipment, tools and products ever held by the railroad industry, is serving as the focal point for meetings of most of the industry's trade supply and traffic organizations. McCormick Place, Chicago's large lake front exposition hall, and the nearby 31st Street Yard of the Illinois Central are the exhibit areas.

The week-long Exposition, open from Wednesday, October 9, through Wednesday, October 16, will feature products of over 300 railway industry suppliers. Within McCormick Place there will be over 120,000 sq ft of exhibits. Over 6,000 ft of track will be occupied by equipment displays in the 31st Street Yard. J. P. Kleinkort, chairman of the Combined Railway Suppliers Association, is coordinating the activities of the four supply groups normally responsible for exhibits held in conjunction with meetings of the individual industry organizations.

One member of the CRSA is the Railway Supply Association which, with its predecessors, has previously sponsored exhibits for the meetings of the AAR Mechanical Division and the Coordinated Associations. Other members of CRSA are the Association of Track and Structure Suppliers, National Railway Appliances Association, and Railway Signal and Communications Suppliers Association. Locomotives, cars, equipment components and maintenance tools will comprise a major portion both of the indoor and outdoor displays.

General meetings of the industry groups, including the annual meetings of the AAR Mechanical Division and the four Coordinated Associations, will be held at McCormick Place. Last month's limited annual business session of the Mechanical Division is being followed by the formal annual meetings of the Division scheduled for Friday, October 11. The business session, held June 25 and 26, was necessary to process recommendations which must be submitted for letter ballot in time to be effective on January 1, 1964. This was deemed impossible following an October meeting. The Mechanical Division has not yet announced the activities of its October annual meeting.

Coordinated programs have been virtually completed (RL&C, May, p 22). All four groups will hold their first sessions on Monday, October 14. No sessions are scheduled for Tuesday afternoon, October

(Continued on page 9)

CREATIVE RESEARCH • QUALITY PRODUCTS • PROFESSIONAL SERV

Climb aboard "railroad cleaning unlimited"

Systemwide service . . .

Your Wyandotte railroad cleaning specialist is assig permanently to your line. His job? To serve you. To do t he goes anywhere you need him. He's not restricted to a local area, so he can provide service on a systemwide ba

He's had experience with every railroad-cleaning probl And his experience becomes yours. He makes it his bu ness to find the most direct, economical answer to dividual problems. It's a common-sense approach, back up by technical skill. End result: better cleaning at low practical cost.

Specialized products . . .

Every railroad has its own unique cleaning problems. meet them, Wyandotte makes a wide — yet highly sp cialized — line of cleaning products. Here are a few:

FAIRTREX® — powerful spray-gun cleaner for medium- heavy-duty jobs. Excellent for steam cleaning, also. Sp cially designed to prevent scaling. Gives fast, effecti results . . . even with low concentrations. Safe to use.

WYANDOTTE 468 — Solvent-emulsion cleaner and degreasi compound (synthetic-type) for use wherever heavy grea and oil accumulate. Because it's concentrated, it delive outstanding results even at high dilution ratios.

AEROWASH — liquid, all-purpose alkaline cleaner with fa thorough cleaning action. Especially effective for exteri and interior cleaning of diesel locomotives, passenger, ba gage and mail cars. Easy to use — no mixing. Just dilu and put it to work.

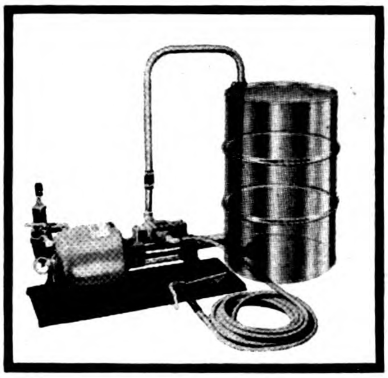
PAINT STRIPPERS — Wyandotte has a complete line paint strippers, including: organic strippers for woo or metal; heavy-duty alkaline strippers for steel, iro copper, magnesium.

Complete new line of air-operated cleaning pumps . . .

TOPPER 1 – Portable, stainless drum pump. Air motor is completely separated from the pump (divorced). Transfers liquid concentrates, paint removers, emulsion-cleaning compounds from drums. Applies cleaning solutions directly to surface being cleaned.

TOPPER 2-5 – Portable, divorced, stainless pump with 5:1 pressure ratio. Adds extra cleaning effectiveness to solution by propelling each droplet against the soiled surface. Creates high-velocity spray by forcing the cleaning solution through specially shaped orifice.

TOPPER 3-10 – Portable, heavy-duty pump with 10:1 ratio. Its high-velocity spray reaches out-of-the-way areas. Gets out stubborn soil deposits, removes corrosive salts. 100 psi delivers 1.2 to 2.6 gpm of cleaning solution at 400 to 700 psi nozzle pressure.



TOPPER 4-5 and 5-10 – Heavy-duty, horizontal pumps with 5:1 and 10:1 pressure ratios. Remove heaviest grease, soils, grime. Extra-long stroke delivers more fluid to speed large-area cleaning, reduces number of strokes per minute, saves pump wear and air consumption.

Now Wyandotte offers air-operated cleaning pumps that give you the effectiveness—without the disadvantages — of steam guns. You gain greater mobility from air-operated pumps, because you don't need a steam source. No more steam to impair vision, injure personnel.

The pumps propel your cleaning solution with jet-spray velocity through a special nozzle orifice. This energy works with the chemical action to provide you with a powerfully effective cleaning spray.

Wyandotte's railroad cleaning program is complete. We've got the service, the products, even the pumps. We're ready to put them to work for you. Call us.

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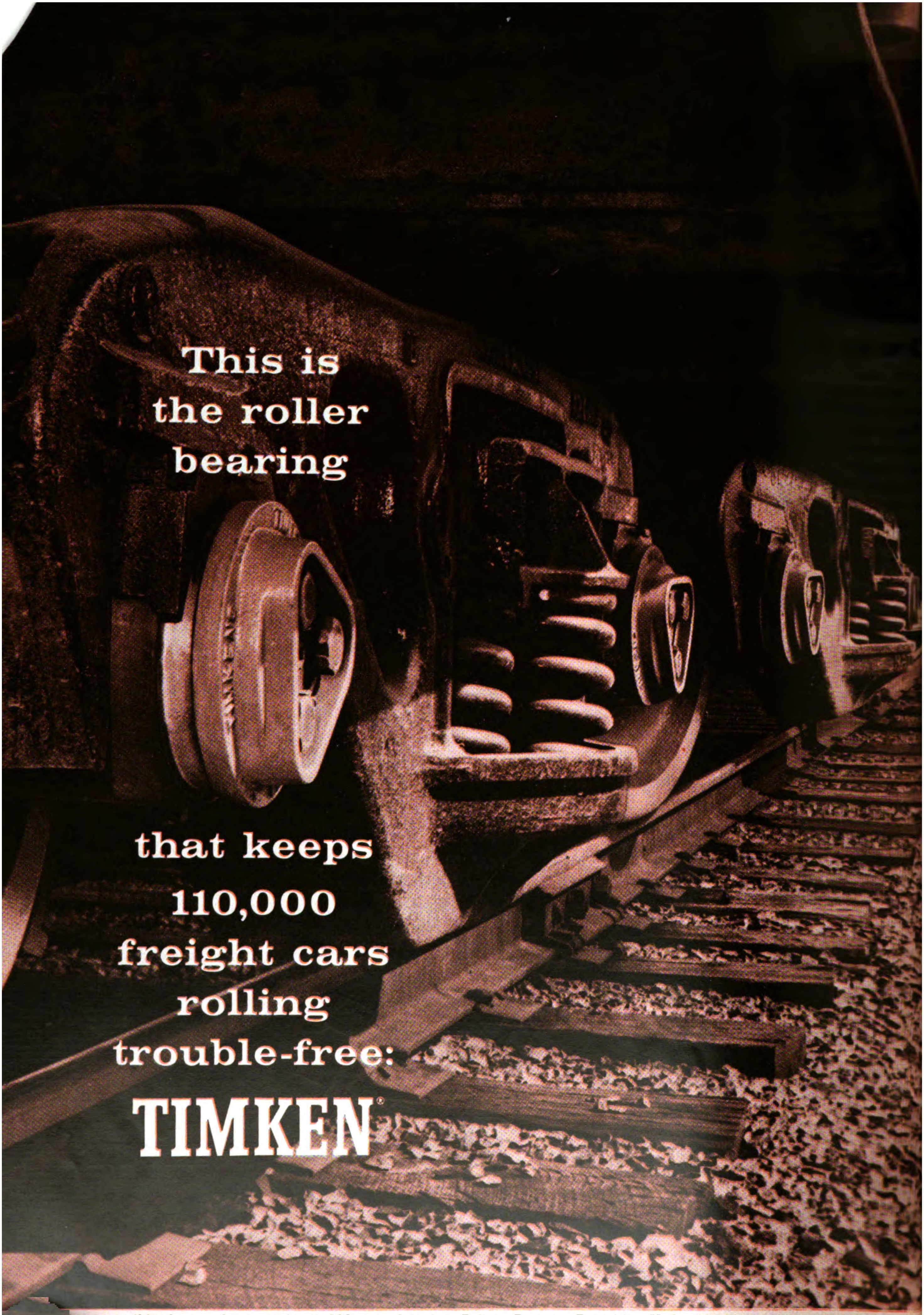


ve something in store for you at booth 619 at the American Railway Progress Exposition, McCormick Place, Chicago, Oct. 9 through

15, following the luncheon at which Mr. Kendall will speak. This is to give time for everyone to visit the exhibits. Concluding sessions will be held on Wednesday, October 16.

Presidents of the four Coordinated Associations are: Air Brake—J. H. Russell, superintendent air brakes and steam heat equipment, New York Central; Car Department Officers—C. W. Kimball, chief of car inspection, Southern; Locomotive Maintenance Officers'—C. A. Love, chief mechanical officer, Louisville & Nashville; Railway Fuel and Operating Officers—L. H. Leikel, road foreman engines, Baltimore & Ohio.

New Haven To Resume Electric Freight Service

Eleven 3,300-hp rectifier-type electric freight locomotives are being acquired by the New Haven "to operate substantially all . . . freight service between Cedar Hill Yard in North Haven, Conn., and points in New York City." Freight operations in this area were dieselized several years ago. The eleven operating units, a twelfth which will be used as a source of parts, and a $32,000 stock of maintenance material are being acquired from the Norfolk & Western which, a year ago, discontinued electric

(Continued on page 49)

Orders and Inquiries for New Equipment

Placed Since Closing of June Issue

Passenger Car Orders

Chicago Transit Authority.—*Pullman-Standard:* 180 air-conditioned rapid-transit cars. Cost, $18,990,000. Delivery to begin in April.

Locomotive Orders

Burlington. — *Pullman-Standard:* 50 60¾-ft 100-ton auto-parts cars with 16¾-ft plug doors, cushion underframes and roller bearings. Estimated cost, $1,109,300. For early August delivery.

Chesapeake & Ohio.—*EMD:* 32 2,225-hp GP-30 locomotives to replace outmoded diesel power. Cost, $6.4 million. Fourteen to be delivered in August; 18 in September.

Southern.—*EMD:* 60 2,250-hp diesel-electric locomotives. Cost, approximately $11 million. Delivery to begin in September.

Union Pacific.—*Alco:* 3 5,500-hp Century 855 units. *GE:* 3 5,000-hp U50 units. Six units to be delivered by end of year.

Freight Car Orders

Atlantic Coast Line.—*Bethlehem Steel:* 200 giant size woodchip hopper cars. Cost, over $2.75 million. For November delivery. *Pullman-Standard:* 4 89-ft, 70-ton, Hydroframe-40 flat cars equipped with Whitehead & Kales bi-level auto racks. Cost, approximately $100,000. For August delivery.

Canadian National.—*National Steel Car:* 55 tri-level automobile rack cars. For delivery later this summer.

Canadian Pacific.—*National Steel Car:* 75 89-ft, 70-ton tri-level flat cars for automobile service, delivery of which to begin later this summer; 75 70-ton drop-bottom gondola cars. Cost, over $1 million. Cars to be assigned to road's subsidiary, the Dominion Atlantic in Nova Scotia, for gypsum traffic. Deliveries to begin this month.

Chesapeake & Ohio.—*Pullman-Standard:* 325 50-ft, 70-ton insulated box cars with cushion underframes. Cost, $6.6 million. *General-American:* 75 Airslide hopper cars. Cost, $1.1 million. *Company shops:* 50 Roadrailer units equipped with both rubber tires and flanged wheels. To be used in passenger trains to extend to Chicago a rail-highway mail-and-express service now operating Detroit-Grand Rapids-Muskegon. Delivery to begin in about four months.

Chicago & North Western.—*Thrall Car:* 25 60¾-ft 100-ton box cars. For late September delivery.

Chicago Great Western.—*Thrall Car:* 10 52½-ft, 70-ton gondola cars (for delivery this month); 5 70-ton covered gondola cars (for August delivery). *General American:* 6 70-ton Airslide covered hopper cars (delivered in June); 25 50-ft insulated box cars with cushion underframes (for fourth quarter delivery). *Pullman-Standard:* 10 70-ton covered hoppers (for August delivery).

Clinchfield.—*Magor Car:* 75 70-ton, 50-ft 6-in. cushion underframe box cars equipped with 9-ft doors, roller-bearings, and damage-free devices. Cost, nearly $1,190,000. For September-October delivery.

Denver & Rio Grande Western.—*Thrall Car:* 31 100-ton box cars. For September delivery.

Detroit, Toledo & Ironton.—*Greenville Steel Car:* 50 60-ft, 70-ton box cars. For August delivery.

Green Bay & Western.—*Greenville Steel Car:* 10 60-ft box cars. Cost, approximately $200,000. For August delivery.

Louisville & Nashville.—*Pullman-Standard:* 60 60-ft, 100-ton box cars equipped with cushion underframes. For August delivery. To be installed in an auto-parts pool.

Milwaukee.—*Pullman-Standard:* 25 100-ton box cars. Cost, approximately $557,000. For late August delivery.

New York Central.—*Pullman-Standard:* 140 70-ton tri-level auto-rack cars, with racks supplied by Whitehead & Kales. Cost, $3.1 million. Delivery to begin August 1. On lease from Merchants Despatch. *Greenville Steel Car:* 85 100-ton cushion underframe box cars with specially designed racks and bulkheads for handling automobile axles. Cost, $2.1 million. Delivery to begin in Fall.

Norfolk & Western.—*Pullman-Standard:* 6 89-ft, 70-ton bi-level rack cars for shipment of new trucks from assembly plant to dealers. For August delivery.

North American Car.—*Company shops:* 300 tank cars of 10,000 to 10,500 gal capacity for use in lease service. Cars to be constructed of Reynolds aluminum plate and extrusions, and tanks fabricated by J. B. Beaird division, American Machine & Foundry; *ACF:* 323 70-ton Center Flow covered hopper cars equipped with solid-bearing trucks, for leasing service pool. Unit price, $12,000. 120 for delivery this month; balance for fourth quarter delivery.

Rock Island.—*Pullman-Standard:* 500 40-ft, 50-ton box cars. Cost, approx. $4.2 million. Delivery to begin in August.

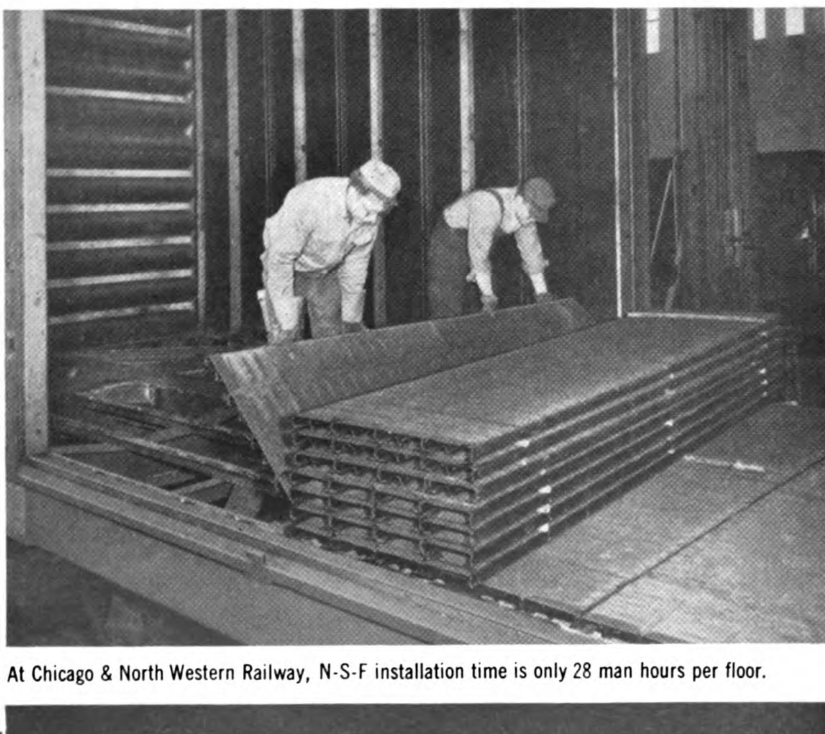
Southern Pacific-Cotton Belt.—*ACF* and *Pacific Car & Fdry:* 1,400 100-ton Hydra-Cushion box cars. Includes 100 50-ft insulated cars with lading devices and extra heavy floors for tinplate service, and 1,300 60-ft cars—500 of 6,038 cu ft capacity with 16-ft double doors for auto parts and paper service, and 800 insulated cars of 5,537 cu ft capacity with 16-ft door opening and double-plug doors. Deliveries to be completed by autumn. These orders are part of SP's $100 million capital improvements for 1963 to include "new freight cars and highway equipment specifically designed to meet new and changing shipper requirements." SP 1963 acquisitions will include flat cars up to 89 ft long and box cars up to 85 ft.

Union Pacific.—*Pullman-Standard* and *Company shops:* 2,100 roller-bearing equipped cars for delivery during 1963 and the first part of 1964. Included are 300 40-ft double-deck livestock cars with slatted steel slides; 450 90-ton covered hopper cars of 3,500-cu-ft capacity; 50 70-ton flat cars; 250 90-ton ore cars, and 1,050 box cars with cushioning device—500 50-ft, 70-ton cars with double doors; 400 50-ft, 70-ton insulated cars; 100 50-ft, 90-ton cars, and 50 60-ft, 90-ton cars with plug doors.

Wabash.—*Greenville Steel Car:* 25 60¾-ft, 100-ton box cars for high-density auto-parts service. Cost, approximately $500,000. For September 1 delivery.

Western Pacific.—*Pullman-Standard:* 25 60-ft box cars with 16-ft doors, cushion underframes with 20-in. travel, 100-ton trucks, all-steel floors for concentrated 20,000-lb loading, and load containers for auto parts. Unit cost, $22,025. For delivery this month.

N-S-F® GIVES YOU A NEW FLOOR THAT'S A



At Chicago & North Western Railway, N-S-F installation time is only 28 man hours per floor.

One thing you can say a wornout floors: They we made with **N-S-F**.

N-S-F is National Steel's able Steel Flooring, the that stands up *years* lo than the others.

Replacing with **N-S-F** gives a better floor in every With its patented design tingstrength where it's nee **N-S-F** takes all types of la with ease, all kinds of pun ment without buckling. durable, sturdy flooring th go years without needing pairs. Made of rugged GL steel and welded directl the underframe, **N-S-F** a strength to the entire c especially in the bolster a

NATIONAL STEEL CORPORATION

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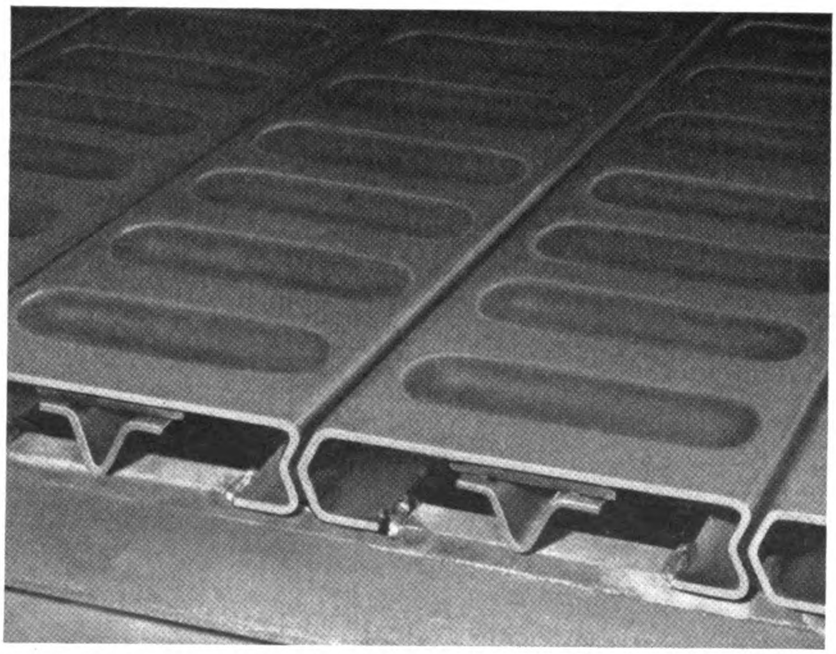
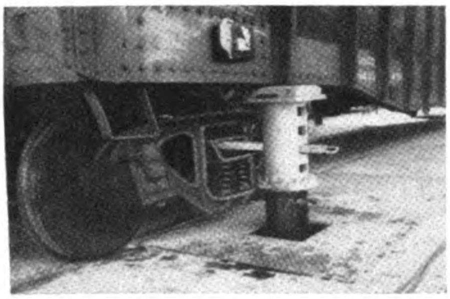
lontgomery St., San Francisco
if.; 613 15th St. N. W., Wash-
n 5, D. C. In Canada: 6205
De Liesse Road, Montreal 9,
ec, Canada.**


Patented N-S-F design provides high strength. Many types available to meet varied load requirements.

What's New in Equipment



Hydraulic Side Jack

The 40-ton RMC jack for spot car repair systems includes a mechanical safety device and hydraulic controls which permit simultaneous operation of all jacks from a remotely positioned control panel, and a side-frame-lifting bar which is said to accomplish more work at approximately 30% less cost. The car is jacked on the body bolster to point where center plate is cleared, the jacks stopped, and the lifting bar inserted through the special jack head into the bolster cavity. Jacks are then raised further, with bolster and side frame being lifted. Journal boxes can be repacked, center plate greased, and, because the bolster is lifted, truck spring and accessories can be replaced — work not possible with jacks lifting under the side frame. Railway Maintenance Corp.

For more information, circle 7-1 on card following page 50.

Safety Coating

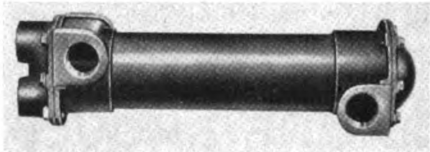
Sure-Foot gray primer E-47 is formulated to seal off oil and bond Sure-Foot non-slip abrasive paint to oily surfaces. It is said to dry in 1 hr. and to be impervious to oil drip, cutting compounds, mineral solvents and most chemical solutions. It can be applied to wood, cement and composition materials by brush or spray. Frost Paint & Oil Corp.

For more information, circle 7-2 on card following page 50.

Convertible Air Drill

Adapters are said to convert the Sioux 1450 ¼-in. air drill to four other tools: a stall-type, direct-drive screwdriver with ¼-in. hex quick-change chuck; a nut runner with ¼-in. or ⅜-in. square drive; a wire brushing tool, or a hole saw. The Sioux 1450 weighs 2 lb 4 oz. It delivers a full ⅓ hp. Standard speed is 2,600 rpm, but speeds of 2,000, 3,000 and 5,000 rpm, may be had. Speeds are regulated by a simple screw driver adjustment. Albertson & Co.

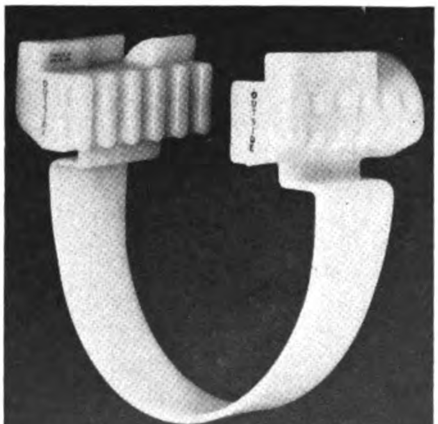
For more information, circle 7-3 on card following page 50.



Fuel Oil Heater

The Vapor diesel-engine fuel-oil heater uses waste heat from the engine-cooling system to improve fuel viscosity in sub-freezing weather. It is said to eliminate paraffin accumulation in pumps, filters and injectors, preventing engine power loss or failure. No insulation of fuel tanks is required. Copper tubes rolled into headers on the drawn seamless brass body are silver soldered to guarantee no water leakage. Vapor Corp.

For more information, cirle 7-4 on card following page 50.



Journal Stop

The Calco journal stop, molded in one piece of high-molecular weight nylon, is installed in plain-bearing journal boxes without alteration to box and with no fasteners. It consists of two side-bearing blocks and an integral supporting strap. Stop is restrained from horizontal movement by the bearing retaining lug and axle collar. Supporting strap holds the stop blocks against the sides of the journal box with a moderate spring action. Faces of these blocks are recessed at regular intervals to prevent the wiping of the oil film from the journal surface. To install, it is only necessary to jack the box and remove the lubricator, bearing and we[...] Device has AAR approval for test [...] cations. Callaway Mills, Inc.

For more information, circle 7-5 on [...] following page 50.

Windshields

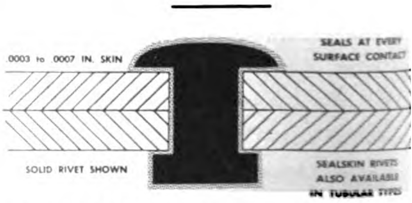
Electrapane windshields are said to [...] New York Central enginemen clear vis[...] ity despite snow, ice and fog, while [...] protecting against the penetration of [...] jects. Windshields now in use on the [...] m-u commuter cars are constructed of [...] in. and ⅛-in. polished plate glass, lamin[...] with an interlayer of vinyl .080 in. th[...] The thicker outside pane is coated on [...] inner surface before lamination with El[...] trapane, a micro-thin, transparent m[...] oxide film which enables the surface [...] conduct an electric current which di[...] pates approximately 75 watts per sq ft [...] 115 volts. Libbey-Owens-Ford Glass C[...]

For more information, circle 7-6 on [...] following page 50.

Self-Tapping Screw

The Parker-Kalon Kaptiv screw form[...] own threads in steel, plastic, alloys of [...] per, aluminum and other metals. It is m[...] of case-hardened low-carbon steel in a [...] thread design, coarse for the end with [...] threads following up to the screw head. [...] forming or extruding finer threads in [...] screw hole, the coarser threads are [...] vented from re-engaging as the Kaptiv [...] unscrewed. Parker-Kalon Div., Gen[...] American Transportation Corp.

For more information, circle 7-7 on [...] following page 50.



Coated Rivets

Rivets, coated with a thin, flexible film [...] an oil-resistant elastomer properly set, [...] said to prevent leakage of gas, oil, [...] aromatic fuels, water and other liquids. T[...] coating remains flexible to temperature [...] −100 deg F and is not appreciably soften[...]

(Continued on page 14)

What's New

(Continued from page 12)

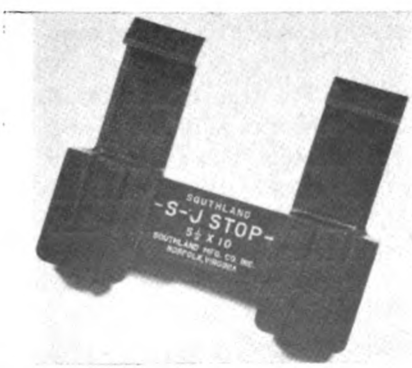
up to 250 deg F. To prevent heads sticking together during the coating process, the fastener head has a slight radius. The coating can be applied to anodized aluminum rivets, but not to non-porous plates such as nickel or chromium. The fasteners are set on standard rivet setting equipment, no special procedure being required. National Rivet & Mfg. Co.

For more information, circle 7-8 on card following page 50.

Electrode Boilers

Electrode boilers from 2 to 60 bhp, operating from 15 to 500 psig, can be used for standby heating and off-season steam supply. When placed on wheels, they may be used as portable steam cleaners where oil-fired steam cleaners cannot be used; only an electrical connection is required. The water, acting as a conductor of the current, heats as the electricity passes from one to the other of three electrodes suspended in a pressure vessel, generating steam. Electric Boiler Corp. of America.

For more information, circle 7-9 on card following page 50.



Journal Stop

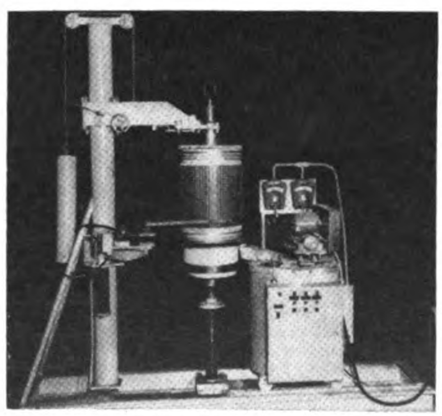
No disassembly of the truck side frame or journal box modification is needed for installation of the S-J journal stop. After jacking the journal box and removing bearing and wedge, two stops laid on top of the journal, one on either side, slip down and around the bearing stop column. The stop is made from Butadiene Acrilonitrile, an oil-resistant rubber substitute, compressed to high density. It has no metal parts and is said to work in boxes with or without waste-retaining ribs, and with any type lubricating pad. Southland Manufacturing Co.

For more information, circle 7-10 on card following page 50.

Fluid Filters

Available filter media and ratings for the Series 2142 (1,500 psi) and Series 2143 (5,000, 6,000 psi) filters with flow capacities from 12 to 45 gpm are: Poromesh and Hi-Collapse Poromesh (4,500 psi) sintered and calendered woven wire cloth in 2 to 250 micron ratings; Micromesh and Hi-Collapse Micromesh (4,500 psi) woven wire cloth in 5 through 250 micron ratings; Microlox molded and sintered, non-ferrous, depth-type elements with 5, 10, 20 and 40 micron ratings; Micropleat phenolic-resin-impregnated pleated cellulose sheet in 5 through 40 micron ratings; Microfil pleated sheet of bonded inorganic fiber in 2, 5 and 10 micron ratings; Microedge spring-loaded, punched, phenolic-resin-impregnated, cellulose washers in 2, 5 and 10 micron ratings; and Microbon, resin-impregnated and bonded, helically wound cylinders with 40 micron rating. Virtually any gas, hydraulic fluid, fuel oil, gasoline, lubricating oil, chemical solution, acid, or caustic may be filtered using the proper filter medium and housing material. Operating temperature range is —65 to over 500 deg F. Bendix Filter Division.

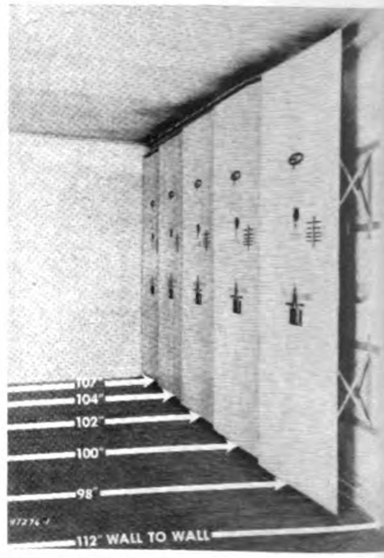
For more information, circle 7-11 on card following page 50.



Soldering Machine

Time for soldering commutator leads on large Westinghouse d-c armatures is said to be reduced 85% through the use of a semi-automatic universal armature soldering machine which uses the "pump-flow" method of hand soldering. The machine consists, essentially, of two elements, one simulating a vertical lathe and, the other, a 500- or 750-lb electrically heated solder pot. The pot contains a stainless-steel pump and electrically heated solder spout and splash board with temperature controls. Soldering speeds vary from 2 to 11 in. per min. The apparatus accommodates armatures up to 48 in. in diameter, with shafts 24 in. and longer and from 1⅝ to 8 in. in diam
The semiautomatic method is said to
vide higher quality soldering throug
use of hi-temperature silver-bearing s
No. 9344.1 instead of the 60-40 comb
tion. Westinghouse Electric Corp.

For more information, circle 7-12 card following page 50.



Side Fillers

The new Evans freight-car side fillers
tend to six positions, fitting any size
car. They do not rest on floor, so the
no obstruction at floor level when hand
palletized loads. Being a permanent
of the car, no panels can be removed
lost. The fillers move outward from
wall and lock automatically in various
sitions. When not needed, they colla
out of the way against the wall. Each
can be unlocked and pulled out by a le
without lifting. Evans Products Co.

For more information, circle 7-13 card following page 50.

Spray Nozzle Connector

The 10314 single-swivel connector is
adjustable mounting for spray nozzles
high-pressure systems up to 600 psi. It
made of brass with a ¼-in. NPT fem
outlet connection. The outlet body can
positioned at any setting in a 360-deg
by hand. The connector stud need not
loosened, and no wrench is needed. The co
nector is designed for any system wh
parts to be sprayed are moved by convey
past the spray nozzle station. Spray
Systems Co.

For more information, circle 7-14 card following page 50.

Editorials

e Big Diesels

›u have a job to do it is essential to know what tools are ilable to accomplish the work. For several months we : known about and reported some big diesel units un- development but not acknowledged by either the rail- ls or the builders. The smoke screen has been blown y by announcements of the past few weeks.

'he June 12 announcement by the Union Pacific that it ordered six "super horsepower" diesel-electrics, three n from Alco and General Electric, rounds out the big el-electric power picture. Previously Electro-Motive announced the 5,000-hp DD-35 booster unit on May when it also revealed the new 2,500-hp GP-35 loco- :ive (RL&C, June 1963, p 53).

'he need for the "super power" locomotives has been dent for some time, especially with railroads using from to fifteen units to power trains. A. E. Stoddard, Union :ific president, in releasing information on the order d "Studies of the road's long-haul, high-speed freight rations have shown a need for locomotives of 15,000 rsepower for on-time handling of trains on today's fast edules." The Locomotive Committee report, pre- ited at the June 25-26 business meeting of the AAR chanical Division said "Higher horsepower diesel units l also permit reduced maintenance costs resulting from erating a lesser number of diesel units."

Alco's contender in the big power field is a 5,500-hp it approximately 86 ft long, weighing about 544,000 lb. d labelled the Century 855. We understand that the UP der includes two Alco A units and one booster unit. The E locomotive, designated the U50, is a 5,000-hp A unit, ½ ft long, also weighing about 544,000 lb. fully loaded. ›th the Alco and GE models have four two-axle trucks th a span bolster transmitting the load to two trucks at ch end, the same wheel arrangement used for the UP's 500-hp gas turbine locomotives. This arrangement con- asts with the two four-axle trucks EMD uses under the D-35.

A fast pace is being set in motive power development, a ice revealed by the Locomotive Committee report. In bulating road-service locomotives available as of May 1, 963 the committee listed 13 models of the three build- 's, but did not include EMD's GP-35 and DD-35 and the E U50 locomotives.

The committee report did, however, include data on all ie Alco models and for the first time made information ublic on the Alco diesel-hydraulic locomotive. Using the ame model numbering system that it adopted for its new 'entury series Alco designated the new unit the Hydraulic 43, a locomotive with six axles (two three-axle trucks) nd 4,300 hp (gross not traction horsepower). The data sted for this locomotive, which we believe to be prelimi- iary, show the unit will be 75 ft 10 in. long and 15 ft iigh. It will be powered by two 12-cylinder 251 engines, veigh 373,000 lb, have a starting tractive effort of 112,000 b at 30 per cent adhesion, a continuous rating of 86,500 b at 10 mph and a maximum speed of 77 mph. No details f the transmission are given but it is expected to be a Voith design, similar to that used in the Krauss-Maffei locomotives.

Another model listed in the table, the Alco Century 628, also emphasizes the rapidly changing locomotive picture. When Alco announced the Century series last January it included the 624 as one of three new models. Before even one was built it has been changed to the 628 model, with a 2,750-hp engine instead of a 2,400-hp power plant.

Announcing these developments pretty well clears up the current diesel-electric locomotive situation. There are a few more "secrets" that have not been divulged, such as details of the new Krauss-Maffei hydraulics for U.S. service and verification of a 15,000 or 18,000-hp gas turbine design. It is also probable that the single engine design will exceed 3,000-hp capacity before long.

During steam days the railroads had control of design and ordered tailor-made power to meet their individual needs. But in this diesel era, design is pretty much standardized and models are ordered "off the shelf." It is most helpful to know what's on the "shelf" when you are in the market for new motive power.

Work Done by Locomotives

In 1920, Hugh Pattison, an eminently capable engineer, then with Westinghouse Electric and Manufacturing Company wrote an article entitled "Basis for Comparing Locomotive Costs." At that time there was much interest in railroad electrification and Mr. Pattison proposed that electric locomotives be equipped with watt-hour meters to record power input to the traction motors and as an accurate means of determining work done by the locomotive. Work done, he maintained, is proportional to wear and tear on the locomotive.

As it happened, the electric never found the wide application that was expected for it. The steam locomotive continued to dominate the field. Now, however, practically all locomotives are diesel electric and it is as simple to measure input to diesel-electric locomotive motors as it is to those on a straight electric.

In his discussion, Mr. Pattison said that the locomotive-mile or car-mile as a unit takes no account of the weight or capacity of the locomotive or car nor of the character of the service. The train-mile unit, he said, makes no allowance for train weight and is therefore as useless a unit as the locomotive-mile for comparing and analyzing repair costs. The ton-mile is given as a better unit but one that can introduce considerable error since it does not take into account heavy-grade operation with consequent greater wear and tear. Records of tons and locomotive miles, too, may not be sufficiently accurate for purpose of maintenance records.

The watt-hour method includes all the work done by the locomotive. It can be used to compare identical units in a fleet. It can serve to check performance of the several units in a multiple-unit locomotive. It can provide valuable data for comparing a few large units with a greater number of smaller units in the same service.

A record of work done is constantly available and any considerable trend away from normal could provide a means for preventing trouble before it happens. The idea isn't new but it would appear that circumstances may have improved its value.

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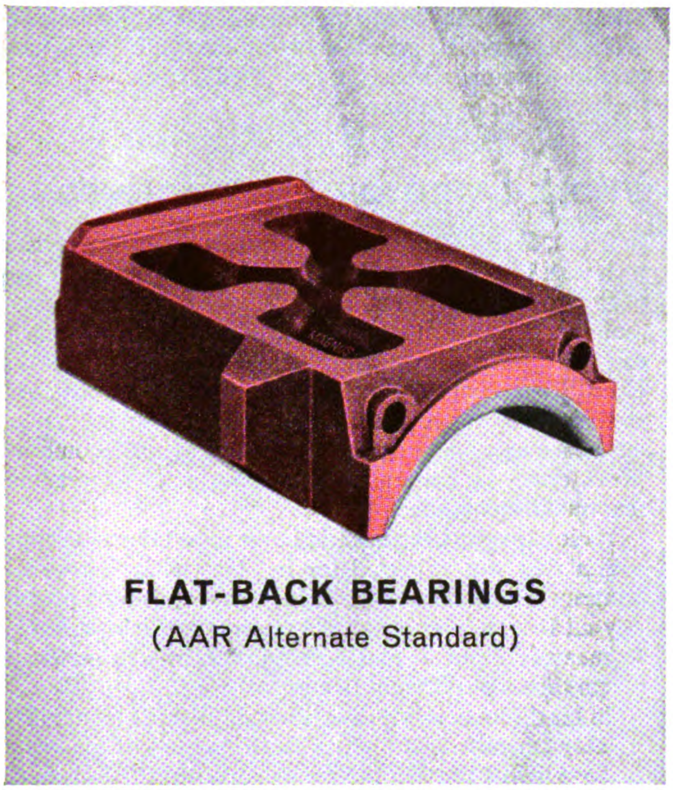
Give you still longer car bearing life, may double bearing performance you're getting now.



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Magnus Flat-Backs stay seated on the journals, eliminate excessive fore-and-aft movement under all normal operating conditions. That means full fluid oil film lubrication, maximum bearing performance all the time. Rear seals and bearings last longer. 2,000,000 car miles per hot box is a realistic goal for Flat-Backs.

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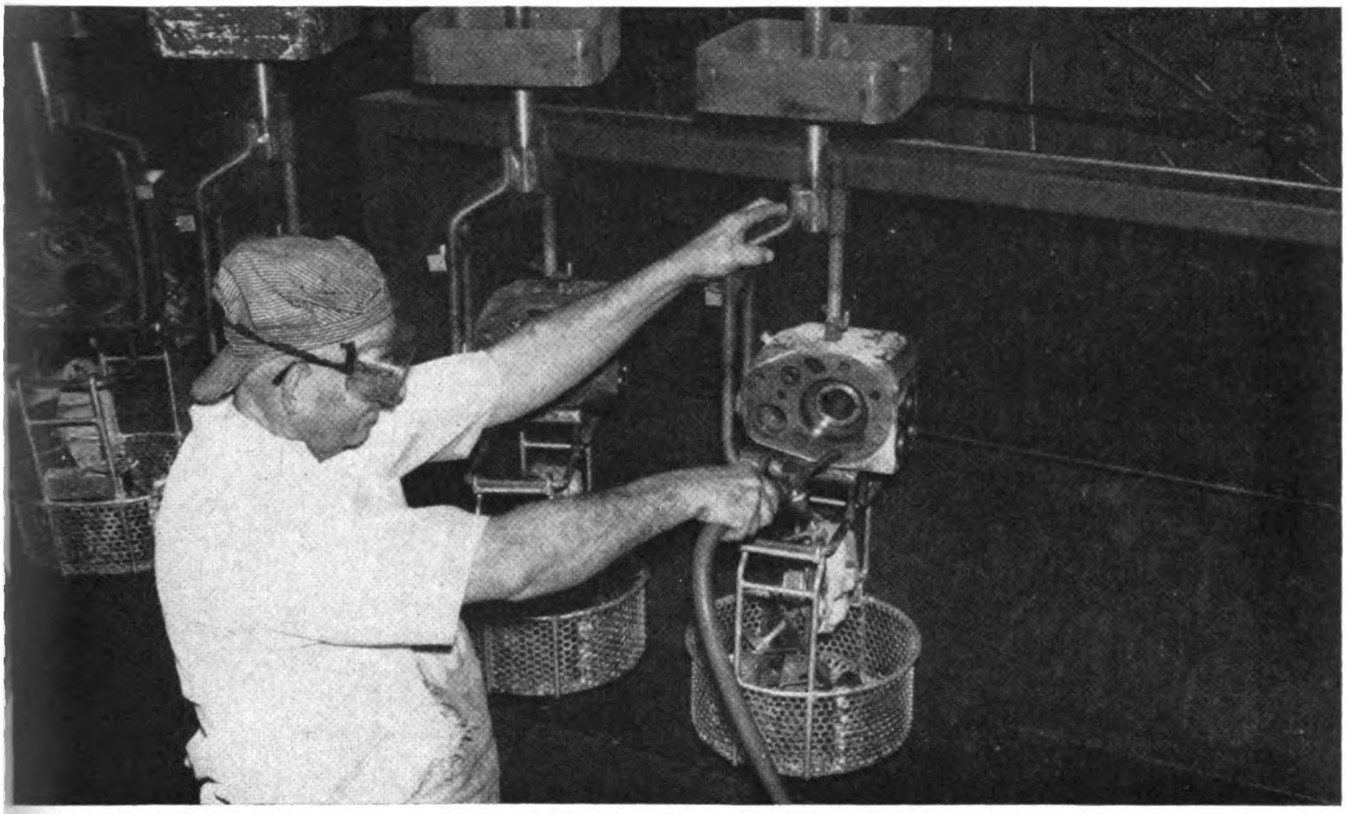


inspection follows ultrasonic cleaning and vapor degreasing. Assembly of the portion comes next as it moves along conveyor.

B Valve Quality Up, Costs Down

ACL production-line overhaul is key to greater efficiency and more effective periodic rebuilding of freight-car brake valves

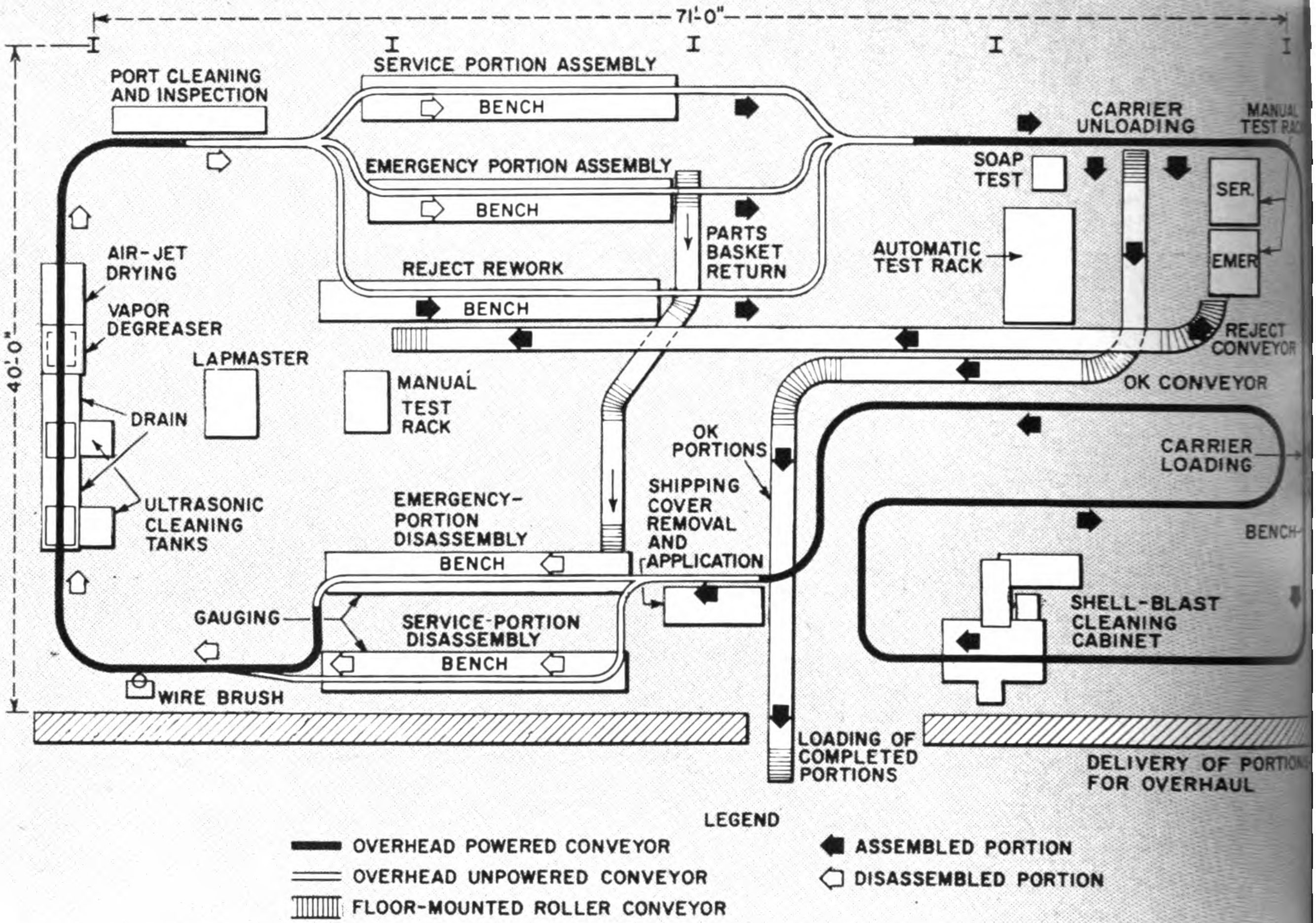
'owered conveyors, ultrasonic .ning, multiple-spindle wrenches disassembly and assembly, and a y automated test rack are all com- ɜd to increase the efficiency and ctiveness of periodic AB brake- ɾe rebuilding at the Waycross, Ga., p of the Atlantic Coast Line.

'he investment in this production- overhaul system is expected to be y amortized in three years. At the ıe time, according to R. W. Ton- g, shop superintendent, the quality valves after overhaul is generally ter, due primarily to the more sys- ıatic procedures along the produc- ı line and the greater precision of automated test rack.

The ACL has concentrated practically all its locomotive and freight-car heavy repairs and the rebuilding of most rolling-stock components at Waycross. This was what was done with all air-brake portions several years ago. At that time a conventionally arranged shop with roller conveyors, individual work benches and manual test racks was established. The repetitive nature and steady high volume of AB freight-car valve work led ACL mechanical officers to consider whether doing this work on a production line would be possible and could be justified.

Over two years ago ACL men began a joint study with engineers of the railway sales organizations of a number of equipment suppliers. Their assignment: the arrangement, tooling and economics of a production line. Time studies were made of existing processes. The study indicated that a production-line arrangement would produce economies and achieve greater efficiency, yielding substantial time savings.

Initial study of the automated air-brake overhaul arrangement was started well over a year before the final decision to proceed was reached in January 1962. Many suppliers, including Chicago Pneumatic, Rapistan-Keystone, Pangborn, Turco Products, and Westinghouse Air Brake, all



Conveyor line 350 ft long is fitted into area of about 2,600 sq ft. Capacity of system is 100 portions in one shift.

worked with ACL engineers to adapt their equipment to fit in the proposed production line arrangement so as to permit a high degree of automation.

Rather than rearrange the existing brake shop, it was decided to relocate the operation in another, newer shop building at Waycross. In this new shop AB valve overhaul occupies about 3,000 sq ft (40%) of the total floor space. The remainder is occupied by benches and manual test racks on which locomotive and passenger-car brake components are overhauled in the conventional manner. ACL mechanical officers emphasize that, at every point on its production line, AB valves are processed so their overhaul complies with the requirements and standards of the AAR Mechanical Division.

The new AB valve shop, in operation since early this year, is arranged along approximately 350 ft of the Rapistan overhead conveyor line. The conveyor loop itself is somewhat shorter than this because the service and emergency portions of the valves are disassembled and assembled on separate, parallel lines. Except at the disassembly and assembly stations, the conveyor is powered, moving at about 7 ft per min. The portions are moved on individual carriers, each of which is suspended from a trolley riding on the conveyor's overhead rail.

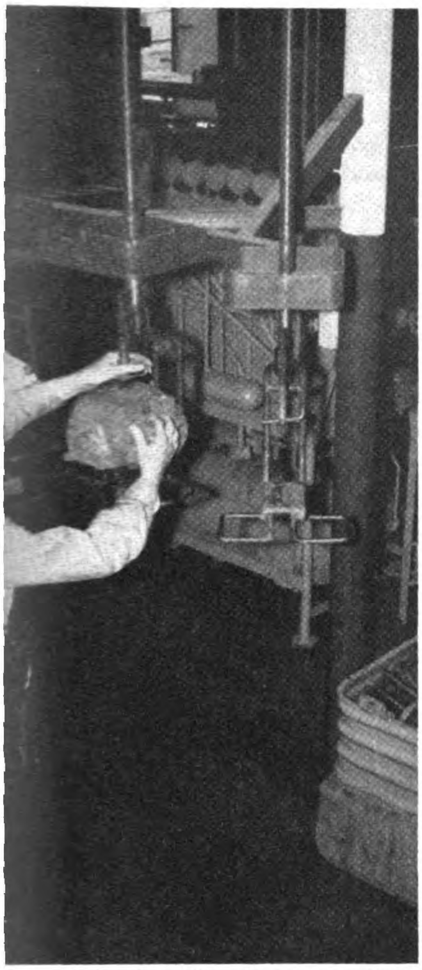
The valve portions come from the freight-car repair lines at Waycross and from all light car-repair points on the ACL system. They are delivered in trays or tote boxes with steel shipping covers, which the ACL uses, in place. The containers are placed on a pair of roller conveyors which move them to the loading station on the production line.

Here each portion is clamped in an individual carrier with the workman at this station running the screw clamp down on the top of the body. Shipping covers remain in place until after the exteriors of the portions are shell cleaned at the next station on the conveyor loop. Normal conveyor height places the portion at a convenient level for working in a standing position.

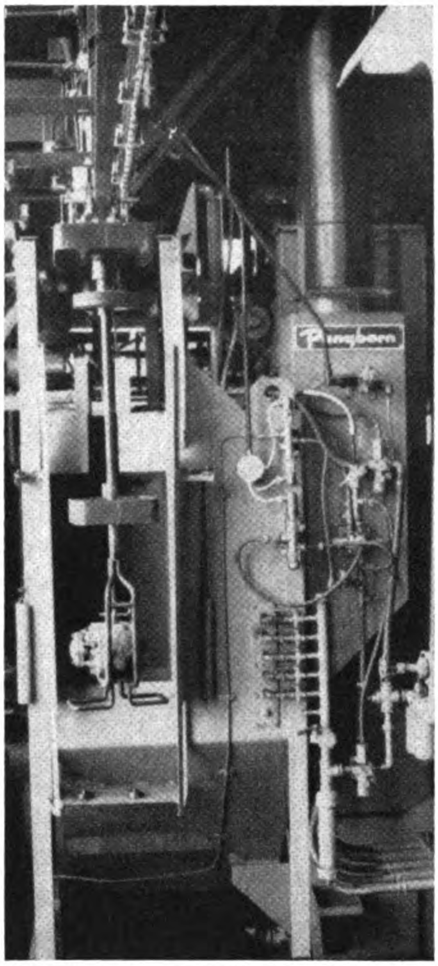
The portion moves along the powered conveyor on its carrier into Pangborn blast cabinet. Here it dw[...] for a 60-sec cleaning cycle, duri[ng] which it is first rotated as nozzles di[s]charging walnut shells descend past [it], followed by an interval during wh[ich] the portion is blown with compress[ed] air. After this, the portion goes in[to] a conveyor storage loop prior to di[s]assembly. Shell cleaning serves to re[]move road dirt and corrosion befo[re] the portion is disassembled.

Storage Sections

Storage sections are incorporated [in] the conveyor system to allow for var[i]ations in production and in manpow[er] assignments along the line. Such fle[x]ibility has been found essential. Sev[]eral years ago the AAR's mandatory "cleaning" interval for AB valves wa[s] extended from 36 to 48 months. Al[]ready AAR officers are working [to] achieve a 60-month interval (RL&C May 1963, p 19). Such changes ca[n] have a pronounced effect on a pro[]duction operation of the type now op[]erating at Waycross. Currently, [...]



iers are loaded with portions due overhaul.



Shell blast cleans exteriors of valve bodies.

Shipping covers are removed by multiple tools.

ıp is producing approximately 30 ; daily on a one-shift basis. Each ge of the production line, however, designed to turn out 50 sets in ht hours.

The portions, cleaned externally, : delivered from the storage loop to station where a CP impact-type, ·ee-spindle multiple tool is used · removing shipping covers. As th most of the fourteen CP multiples ɔng the line, this tool is suspended ɔm a CP balancer.

The parallel conveyor lines, which tend from the shipping-cover re-ɔval station, make possible the sep-ate disassembly of the service and ıergency portions. This arrange-ent was chosen because these two ɔrtions require multiple-spindle tools different design. Even though the ecialized tools have been provided :re, and again at the assembly sta-ɔn, the ACL has found it best to ·ocess only one type of portion on ıe line at a time. Only service por-ɔns will normally be processed for vo days; then the production system ill be converted for a similar interval of overhauling emergency portions. To do this simplifies work at the test racks and at some other points in the overhaul cycle.

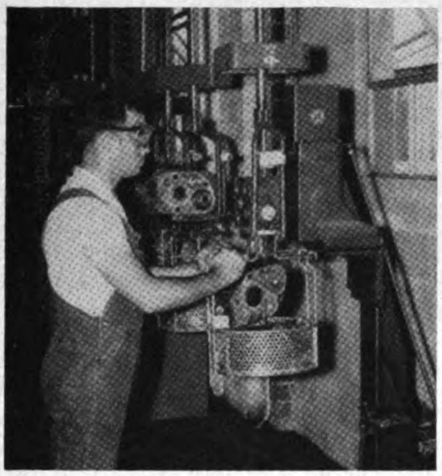
Conveyor Carriers

The bodies of the portions, service or emergency, remain clamped in the conveyor carriers throughout the cycle. At the disassembly stations, however, the covers on the various portion faces are removed and covers and all interior parts are placed in a circular basket suspended from the bottom of the carrier. Interiors of these baskets have been designed to space and hold the valve components so that they will be thoroughly cleaned in subsequent steps and so that they will drain thoroughly after cleaning. Because each portion's components are placed in the basket suspended beneath the body of that portion, there is no problem of matching parts when it is time for assembly.

Disassembly takes place over several work benches. An angle is located above these benches to act as a backstop against which the portions rest while the multiple-spindle tools are being used. For disassembly of the service portion, the following CP tools are used: one four-spindle multiple; one two-spindle multiple, and three three-spindle multiples. For disassembly of the emergency portion, three CP multiple-spindle tools are used. All eight tools are of the impact type and have been individually tailored to remove a specific cover or component. At the last bench on each line are the gauges needed for the inspections complying with AAR requirements. If a component is found defective or not complying with standards, it is removed from the basket prior to going through the subsequent cleaning. At the assembly station the mechanic then knows to substitute a new part for the one missing. Gaskets removed during disassembly are inspected for possible reuse. They do not accompany the portions through the cleaning cycle but are transferred manually to the assembly benches when found reusable.

Next step on the line is a station where the machined faces of the por-

Covers are removed; interior parts go in basket which is hung at bottom of carrier.



Surfaces on body to which gaskets are applied are wire brushed.

tion bodies are wire brushed. This is done by an operator who works with a brushing machine mounted at the proper height above the floor so that it is only necessary to rotate the carrier, cleaning body gasket surfaces.

The carrier then moves on for ultrasonic cleaning of interior components. This cleaning is a two-stage operation, using a pair of Turco 18-gal ultrasonic tanks, the first containing a diluted Turco Jetisol solution and the second, Turcosolv which acts as a rinse for the first solvent. Because solvent cleaning of the body castings is prohibited, the carrier is automatically lowered so that only the parts basket suspended from its bottom is immersed in the solution.

The parts basket is dropped into the Jetisol for a 1½-min cycle, rises automatically for a 1½-min drain cycle over a drip tray, and is then immersed for a 1½-min period in the Turcosolv. This is followed by another 1½-min drain. The carrier proceeds through a vapor degreasing cabinet where trichlorethylene acts to remove all residues from the valve parts. Next step is passage through another cabinet where air jets blow all traces of the solvents from body and parts.

Passages and ports in portion bodies are blown manually at the next station. The valves pass in front of an open-front compartment where an operator with an air hose goes through a specified cycle of blowing each of the openings. The compartment serves to catch the sprays which are produced during this work. Lig at this station makes possible th spection of wearing surfaces in body during the cleaning.

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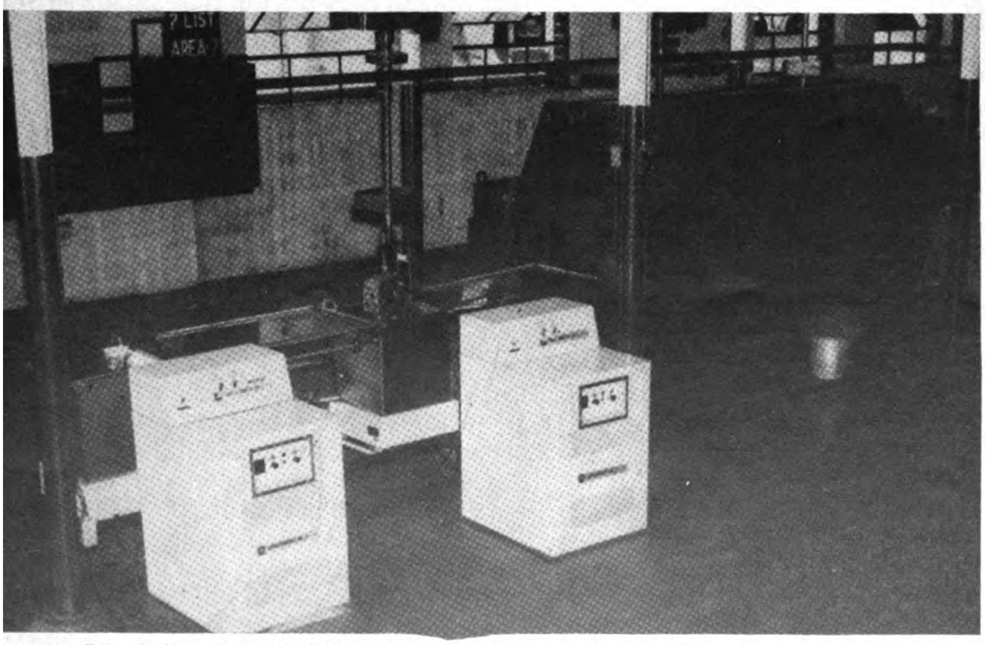
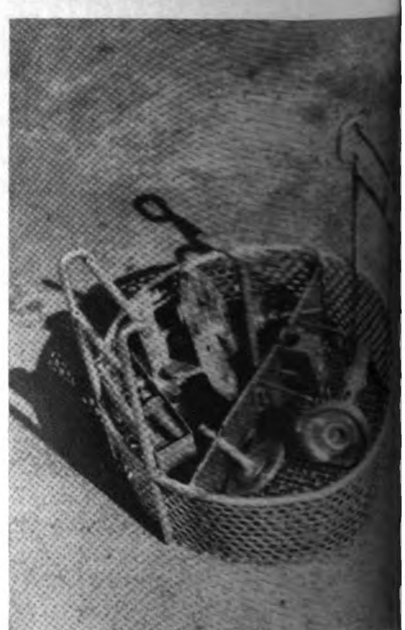


Pair of ultrasonic units (left) clean internal valve components. Vapor degreaser (right) removes residue from body of portion as it moves through cabinet.



Parts basket is arranged so solvent reaches all surfaces and so components drain complete

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mated Testing

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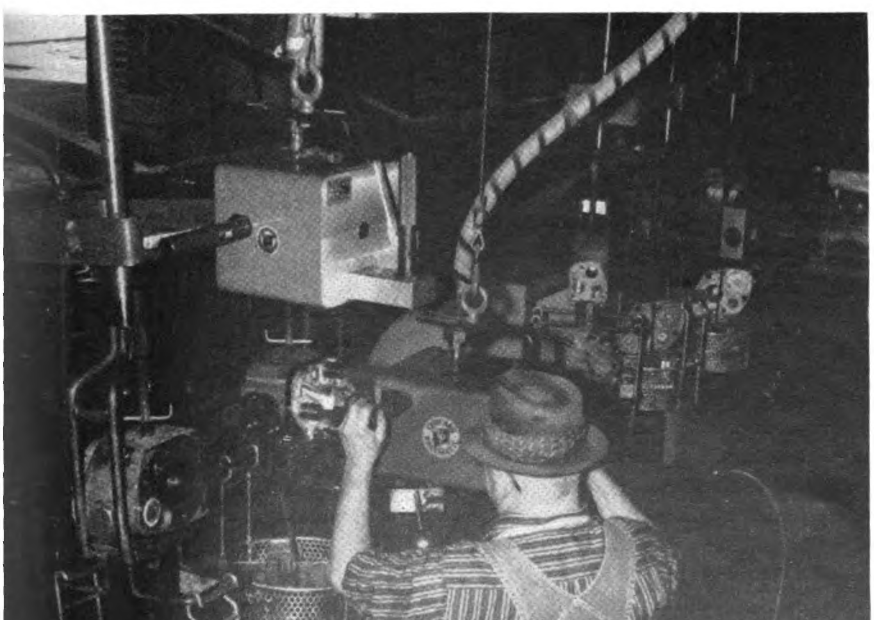
The testing cycle is completed in approximately 6 min, including the installation and removal of the por- tion in and out of the turret where it is clamped during the test. The oper- ator places the portion on the hold- ing studs of the turret and presses on the two clamping buttons which also initiate the test program. The test rack continues to operate as directed by the punched tape which controls its sequential operations. Because the sequences differ for service and emer- gency portions, it would be necessary to change the tape and undue time would be consumed in tape changes if portions were processed over the pro- duction line without classification. This is the prime reason that the ACL has chosen to make extended runs of only a single type of brake portion. It also makes it possible to leave the conveyor set for one route.

In the rack's design it was found that some operations are not easily duplicated by automatic operation. Such control has been attained by converting the manual rack's handle- operated diaphragm cocks to remotely controlled cocks operated by an addi- tional pneumatic operator portion. The combination of a pneumatically operated diaphragm cock and a mo- mentary impulse solenoid valve for control afforded a simple method of pneumatic switching, controllable through standard programming meth- ods. Damaging surges are minimized by providing cushioning forces, alter- nate flow paths, or restrictions of pressure build-up by choking of flow.

Measurement of the variables — time, pressure and flow — presented the greatest problems. Pressure switches, flowmeter relays, and limit switches are used in conjunction with timers to secure the results. Selection of the proper components in a func- tion-selector network is made through the punch-tape programming.

Following completion of the auto- mated test, portions which have passed are placed on a roller convey- or which returns them to the station where shipping covers were removed as they started through the overhaul process. At this point covers are re- applied, using a multiple-spindle tool. Reject portions are placed on another roller conveyor for movement to the repair benches. The tape indicating which test has not been passed is at- tached to the body of the portion. After repair, the portion can be placed on the overhead conveyor again for return to the automated test rack. Re- cently the ACL installed a manual rack adjacent to the repair area per- mitting tests of reject portions to be made there.

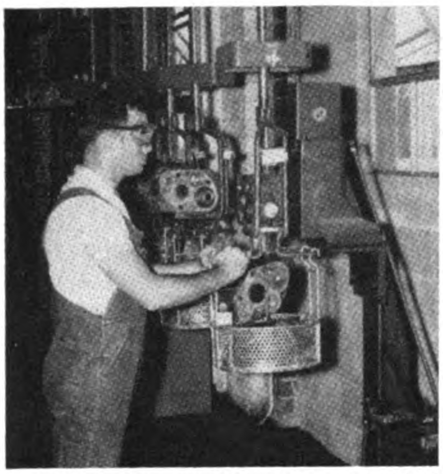
Currently the shop, with a force of 7, is producing 30 sets — 60 portions — daily. Equipment has the capacity to overhaul up to 100 portions on a single-shift operation.



ltiple-spindle tools are used on assembly benches. Several are necessary because of varied lt patterns on the faces of the valve bodies.

Completed portions (foreground) move to shipping-cover bench after passing rack test.

Covers are removed; interior parts go in basket which is hung at bottom of carrier.



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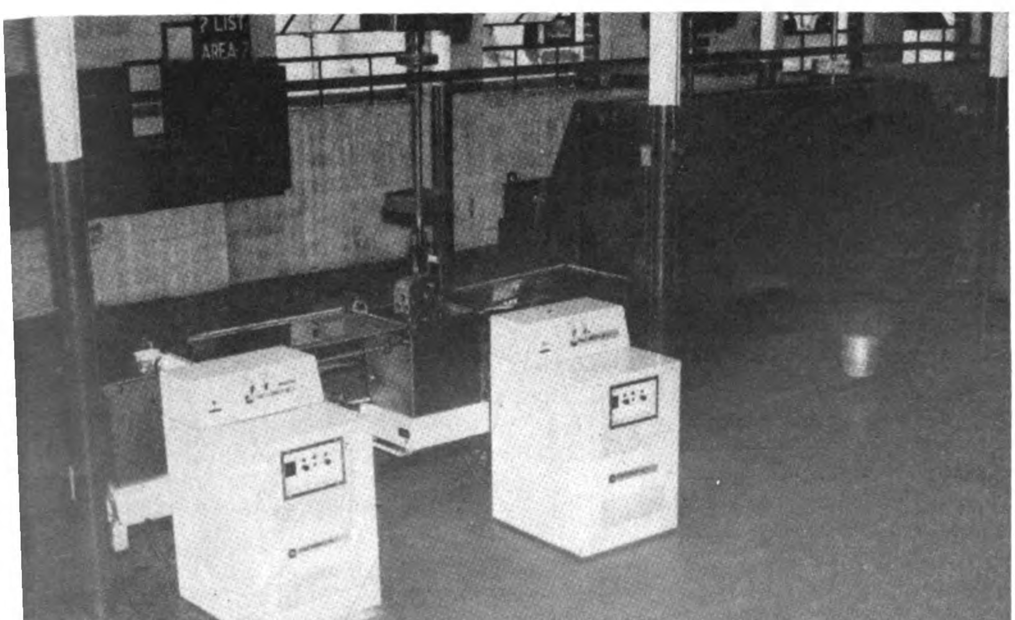

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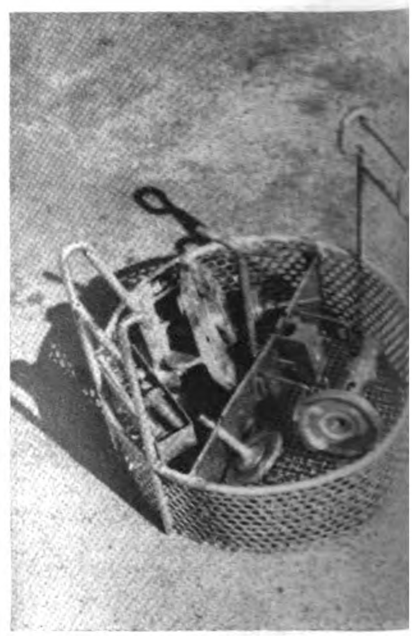

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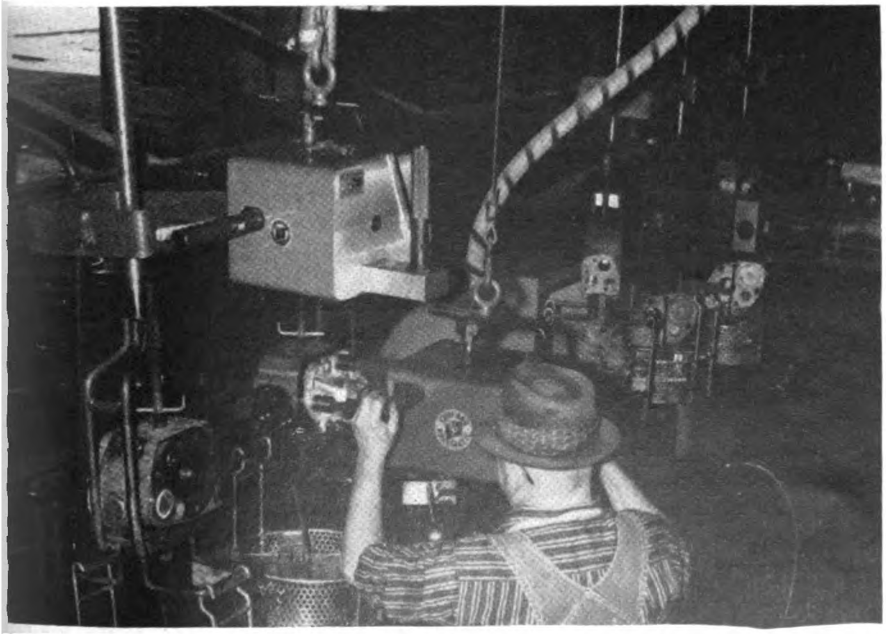
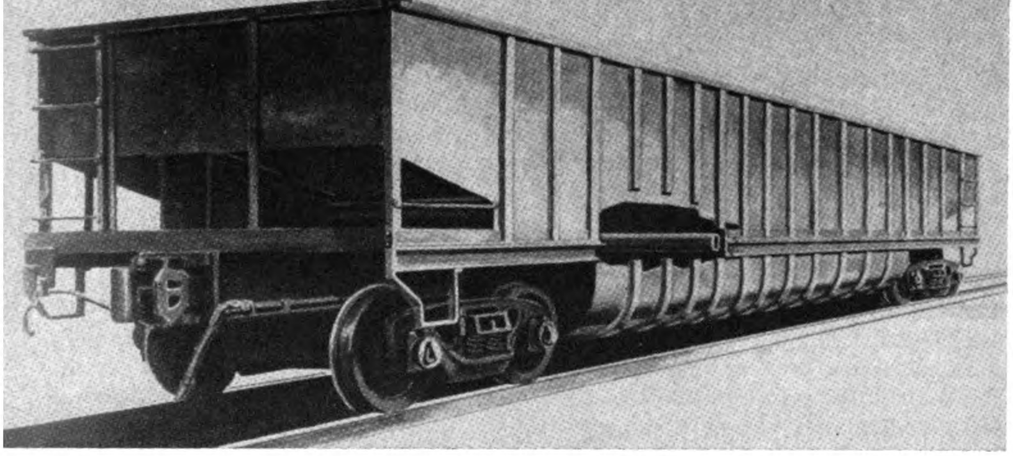
Currently the shop, with a force of 7, is producing 30 sets — 60 portions — daily. Equipment has the capacity to overhaul up to 100 portions on a single-shift operation.

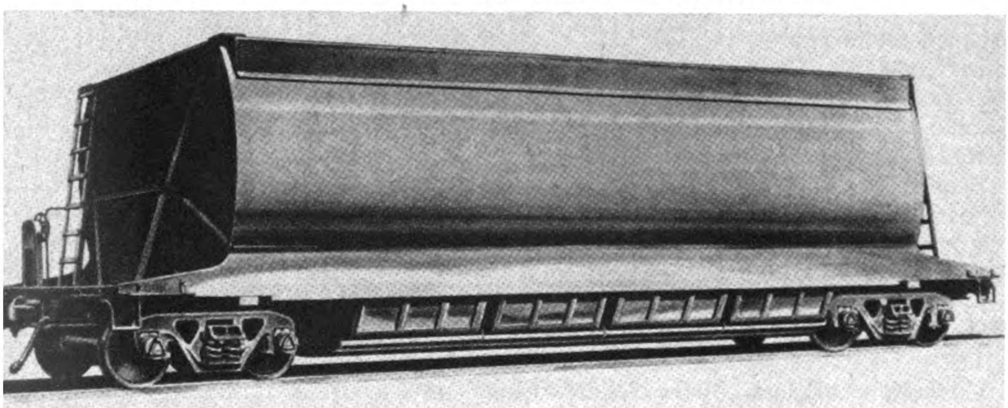


Multiple-spindle tools are used on assembly benches. Several are necessary because of varied bolt patterns on the faces of the valve bodies.

Completed portions (foreground) move to shipping-cover bench after passing rack test.



Gondola for dumper service (above) has "coal belly" to increase capacity without making car longer. Cutaway shows side supports. Rapid-discharge hopper car (below) will have hydraulically operated doors which are to make possible complete emptying in 20 sec.



ACF Open-Tops Designed For Integral Coal Trains

Numerous railroads are planning "integral trains" for regular, fast service between mines and major coal consumers — primarily electric utilities. Whether these trains are to be bottom- or rotary-dumped, ACF is now ready to build cars for the job. The American Car & Foundry Division has announced completion of designs for bottom-dump and rotary-dump coal cars, each capable of handling 100 tons. For both of the 4,000-cu ft cars, rapid unloading has been a prime design requirement.

The proposed cars are based on findings of a study made by the ACF research organization. In this it was found that over half the coal movements in the U.S. have characteristics which lend themselves to the high-volume transportation for which the new cars are specifically designed.

Unit trains are expected to serve entirely new coal-receiving stations as well as existing plants which already have large investments in unloading facilities. Because of this, there are two basic arrangements. The rotary-dump car is designed to utilize existing and proposed car dumpers to their maximum capabilities. The bottom-dump car is designed to unload in the shortest possible time.

Total tonnage dumped at existing rotary installations can be substantially increased by replacing present 50- and 70-ton open hopper cars with 100-ton cars, ACF reports. Many frozen coal problems can be eliminated with a high-side gondola, specifically designed for rotary dumping.

The rotary-dump coal car—basically a gondola—makes it possible to achieve economies in handling and unloading at existing power stations which have the major investments in rotary and high-lift car-dumping facilities. Dumpers could also be expected to unload even faster if it were no longer necessary to uncouple each car prior to its movement into the du[illegible] Future dumpers could be design[illegible] that cars equipped with rotary co[illegible] could be turned over withou[illegible] coupling. Some dumpers of this [illegible] are already in service. Rotary co[illegible] along with locomotive control to [illegible] accurate car spotting, would [illegible] possible unloading of 40 cars pe[illegible]

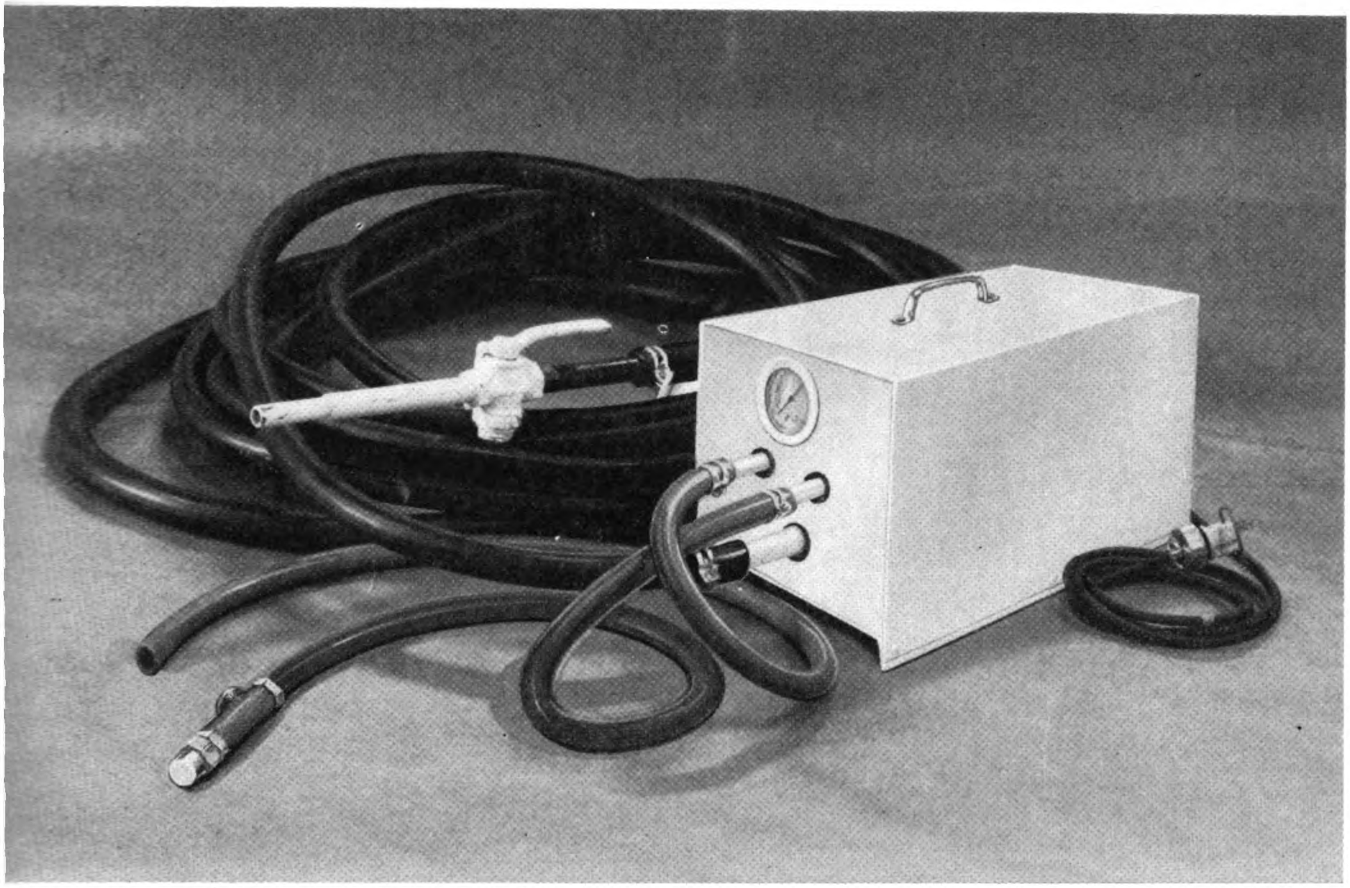
The "coal belly" slung betwe[illegible] trucks increases this car's coal-[illegible]ing capacity without increasin[illegible] length. Car has 4,000 cu ft, 10[illegible] coal capacity. It is 45 ft long an[illegible] ft 6 in. from rail to top chord. Smo[illegible] unobstructed interior insures rapid [illegible]loading. Sharp corners are elimin[illegible] by having fillets and curved sh[illegible] wherever possible. Adequate provi[illegible] is to be made for drainage of wet [illegible] en route. Brake lines and other un[illegible] car equipment will be protecte[illegible] much as possible during thawing.

The bottom-dump car is an o[illegible] top version of the all-welded, s[illegible] center-sill Center Flow bulk mat[illegible] handling car which first appeare[illegible] a covered hopper (RL&C, June 1[illegible] p 33). The 4,000-cu-ft-capacity [illegible] is capable of unloading 100 to[illegible] coal in less than 20 sec without [illegible] aid of shakers. Outlet doors form [illegible] entire floor of the car. Operating p[illegible]sure for the doors is provided b[illegible] electro-hydraulic pump and com[illegible] mounted at one end of the car. T[illegible] unit is self-contained and utilize[illegible] 15-hp electric motor to drive the d[illegible] hydraulic pump under all operat[illegible] conditions. The motor could be [illegible]ranged for manual or remote o[illegible]ation. The car is 52 ft 2 in. long o[illegible] the strikers; 13 ft over top chord.

The cars would be self-clean[illegible] Stainless steel or aluminum s[illegible] sheets would give the smooth surfa[illegible] necessary for rapid unloading. [illegible] lines and under-car equipment, [illegible]cluding door opening motors a[illegible] mechanisms, would be located to m[illegible]imize damage from thawing heat[illegible]

The design of such a bottom-du[illegible] coal car capable of rapid discharge [illegible] dependent upon the design of [illegible] hoppers or dump area into which [illegible] cars unload, and the type of tripp[illegible] mechanism, electrical or mechani[illegible] that is used to trigger the openin[illegible] the car doors. Indications are th[illegible] there may not be one standard ty[illegible] of car for all installations. Under o[illegible]mum conditions, hopper-type cars a[illegible] estimated to be capable of being u[illegible]loaded at almost twice the rate [illegible] dumper-emptied cars.

If you have a point on your Railroad where you now hand-scrub engines—



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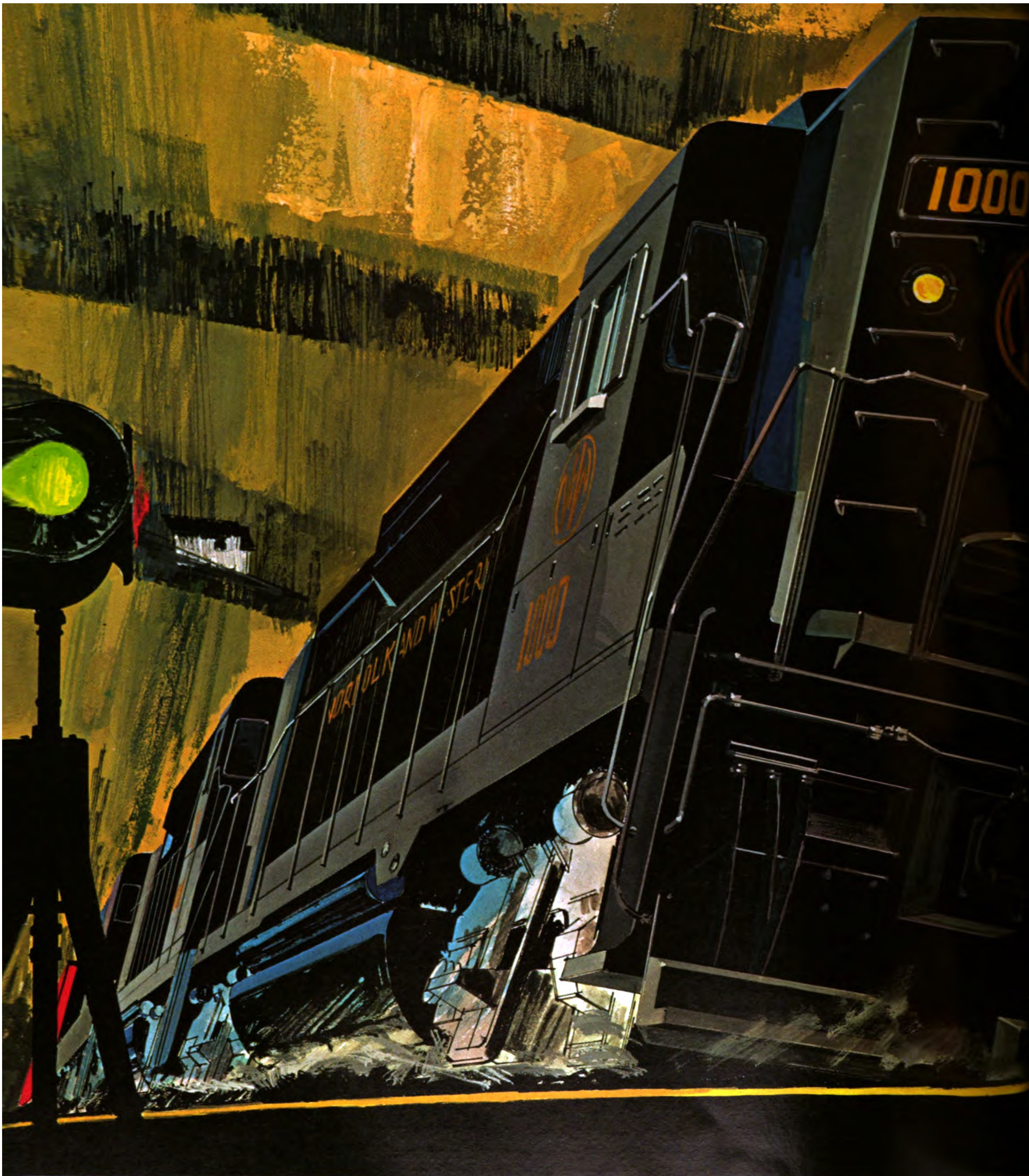

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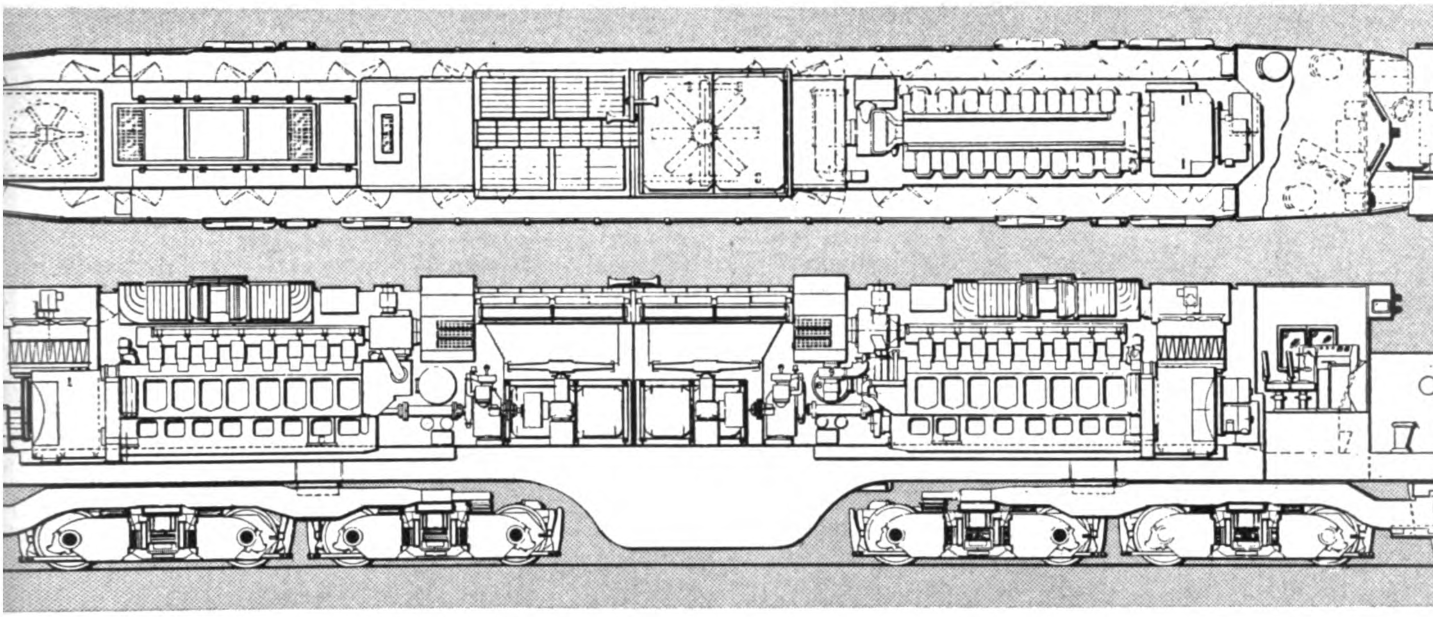
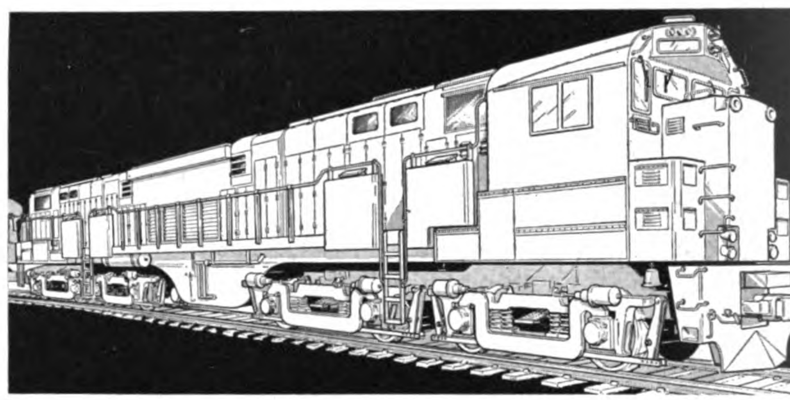


ɩan-bolster running gear and two engines will characterize the new comotives of both builders. Alco Century 855 (above and right) 86 ft long, 16 ft 5 in. high, and weighs 264 tons. Two units will ɩ built with cabs. The third will be a cabless booster.



ȷP Has Ordered High-Hp Diesels From Alco and GE

The 5,500-hp Alco Century 855 ɩnd the 5,000-hp General Electric J50 are to be in service on the Union Pacific late this year. UP has conirmed orders for three diesel-electric ɩnits from each of these builders, ɔointing out that these six "superɩorsepower" models are over twice as powerful as any now built here.

Last month General Motors announced it would build the 5,000-hp DD-35 (RL&C, June 1963, p 53), starting regular production in 1964.

The UP order, reported unofficially four months ago (RL&C, March 1963, p 6), marks an expansion of the recently announced 2,000 and 2,400-hp Alco Century series and gives the U25B, GE's 2,500-hp contender in the domestic locomotive market, a companion with twice the rating.

A. E. Stoddard, UP president, said that studies of his road's through freight services has shown need for locomotives of 15,000-hp rating, or more. Three 5,500-hp or 5,000-hp units will normally be in m-u.

The UP's long interest in high-horsepower units has resulted in its ownership of the world's only gas-turbine-electric locomotive fleet. For over a decade the UP has operated single-unit GE 4,500-hp turbines. Since 1957, GE has delivered 30 two-unit 8,500-hp gas-turbine-electrics, which, in 1961, produced 18.1% of the road's freight gross ton-miles. Recently these residual-oil-fired turbines have been joined by an experimental 5,000-hp coal-fired gas-turbine-electric which is now undergoing road tests.

Along with its turbine fleet, the UP has regularly updated its fleet of conventional diesel electrics. In the past six years more than 300 units of 1,750 to 2,500 hp have been added.

To produce the high-horsepower rating in their new locomotives, the builders will install two diesel engines in each unit. Each unit will have the same type of running gear used on the 4,500-hp gas turbines, a pair of two-axle trucks under a span bolster at each end. All axles are powered.

The Century 855 units which Alco will build are each to be powered by a pair of Model 251, 16-cylinder, V-type diesel engines. This prime mover, used on Alco locomotives since 1956, will operate at a speed of 1,050 rpm. Each engine, coupled to a conventional GT-598 generator, will power the four GE-752 traction motors on the trucks under that end of the unit. Alco reports that the 855 will have the features of previous Century designs, including the pressurized air-filtration system, sealed electrical cabinets and self-cleaning radiators.

The General Electric U50 will be powered by a pair of GE 16-cylinder V-type diesels. This prime mover, previously used on the U25, will be connected to an electrical transmission designed to make effective use of engine output throughout the entire locomotive speed range. It will have other U25 features, including the air-cleaning system and pressurized electrical compartments. All U50 units will have cabs. Each will be 83 ft 6 in. in overall length and 16 ft 5 in. high. Fully loaded, it will weigh 272 tons.

Why the Alternator?

By Gordon Taylor

"I tell you, Doc, things are changing so fast that I can hardly keep up with them." The speaker was Diesel Maintainer Joe Sharp who was talking to Doc Watts at Centerville Diesel House about the GP-30 units being placed in service.

"I'm just getting used to the alternator that replaces the direct-current generator on my new automobile. Now I'll have to get used to the idea that current from the D14 alternator, through rectifiers, excites the battery field of the main generator on these GP-30's. What's going on? Why have they stopped using current from the battery and auxiliary generator to excite the battery field?"

"Well," said Doc, "it may be we can get part of the answer from your new car. Why do they use an alternator to charge your car's battery?"

"Seems to do a better job of keeping the battery charged," replied Joe. "The battery is on its toes and ready to go at all times."

"That is pretty much the reason for using current from the alternator for excitation on the GP-30," replied Doc. "The alternator does a better job. When this unit was designed for increased horsepower, it was necessary to increase main generator excitations to produce the higher output. Upper limit for the alternator is 170 volts as compared with the 74-volt limit of the auxiliary generator. The alternator can deliver 55 amp through the separately excited main generator field on a continuous basis.

"The alternator on your automobile has a set of silicon rectifiers to rectify the current for battery charging. The alternator on the GP-30 relies on larger capacity silicon rectifiers to produce current for the separately excited field of the main generator, even though it is still called the battery field. Is that clear?"

"It is," replied Joe, "but it would help if you could make some sort of diagram showing how the power system and the excitation system work together. Will you do that, please?"

"Well," said Doc, "let's move over to the blackboard where I have drawn what we call a 'block diagram' showing the schematic grouping of the power and control units. It's the same diagram that was used recently in our discussion of static controls for dynamic diesels. [RL&C, Nov. 1962, p 36—Editor.]

"As indicated by the arrows in the block diagram, three-phase alternating current for excitation of the main-generator battery field is obtained from the D14 alternator. The current is first fed to a magnetic amplifier. The magnetic amplifier consists of three saturable core reactors, together with a three-phase silicon rectifier. Most of you understand that an ordinary reactor consists of an alternating current coil wound on a laminated iron core. The alternating field flux surrounding such a coil creates a reactive, or counter voltage that limits the amount of current that will flow in the coil.

"If we wish more alternating current to flow in the reactor coil, we must provide some means of limiting the value of alternating flux surrounding the coil, reducing the value of reactive voltage. The saturable core reactor provides such control by the use of a direct-current winding on the middle core of a three-leg or three-core assembly of coils. The two outside core windings are the alternating current coils, called the power windings. The center core holds the direct-current coil, known as the 'drive' or control winding.

"On the GP-30 unit, the reactor control winding on the middle core is in three parts. One of these coil parts is known as the 'bias winding' and the other two are simply referred to as 'drive' or control windings.

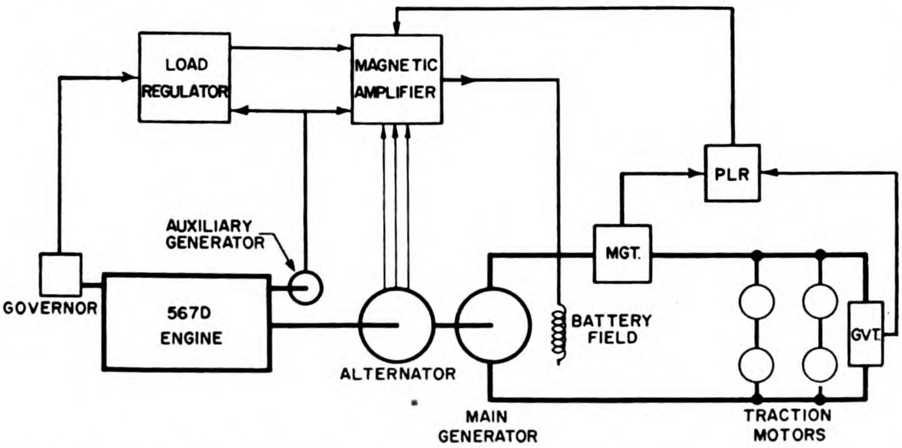
"The flow of direct current (supplied from the auxiliary generator) in the control winding tends to saturate the magnetic circuit of the iron core. This lowers the inductance and reactance in the a-c coils, increasing the flow of current in the a-c power windings. This permits comparatively large values of a-c load current to be controlled with small levels of d-c control current."

"What controls the value of the direct current that is fed to the drive or control coils of the saturable reactor?" asked Jack.

"That's the job of the load regulator and the PLR, power limit relay," Doc replied. "Working together, they regulate the value of direct current flowing into the reactor control coils to establish the value of alternating current that will be reactified for excitation of main generator.

"The load regulator is, in many respects, similar to the load regulator that was used on older units. Like the older model, this regulator is an automatically operated rheostat across the auxiliary generator supply. It is

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.



Schematic diagram of GP-30 control system enabled Doc to explain static-component functions. Transductors have important role in regulating power output.

self-contained unit, consisting of a hydraulic vane motor, driving a rheostat. Engine oil is used to move the vane motor and vary the position of the rheostat brush arm. Lube oil under pressure can be directed to either side of the vane as directed by the load regulator pilot valve in the engine governor. The vane motor is identical to that which drives the commutator type rheostat.

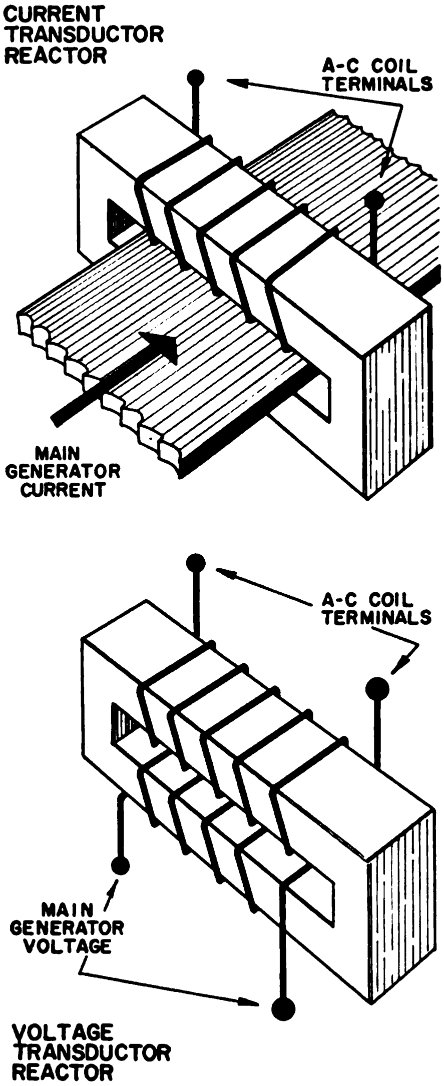
"The big difference between the old and the new load regulator is rheostat size and capacity. The old commuter-type rheostat had 52 contact steps which were connected with two banks of resistance grids and four tube-type resistors. The older load regulator rheostat handled currents as high as 60 amp. The GP-30 load regulator, by contrast, has a 3-in. wire-wound 100-ohm rheostat of 100 watts capacity. Ordinarily it handles about 75 miliamperes."

At this point Joe spoke up. "Doc, a few moments ago you spoke about the part played by the power limit relay in controlling the current that is fed to the drive winding of the reactors in the magnetic amplifier, regulating excitation current supplied by the alternator. Why does the load regulator need help from PLR? Tell us how the PLR gets into the act."

"That's a good question," said Doc. PLR enables the load regulator to do a better job. It does this by supervising the action of the load regulator, more exactly setting the value of current fed to the drive windings of the saturable core reactors in the magnetic amplifier.

"The first thing to understand is that the GP-30 excitation system functions only as an adhesion control system. The governor is the primary device for controlling engine-power output. The excitation system simply controls the output of the main generator. Its job is to release the amount of horsepower that will best handle the train without slipping, considering all operating conditions that may exist at the moment. It does this by means of a feedback control system that is an adviser to the power limit relay. The PLR is a polarized relay, which means that a change of direction of current flow through its operating coil reverses the action of the relay.

"The PLR receives its feedback signals from two voltage transducers, GVT-A and GVT-B, and from two current transducers, MGT-A and



Transductors are current or voltage sensitive.

MGT-B. We discussed this feature in a recent instruction session, but some of it is worth repeating now. The transductors provide signal currents that constantly advise PLR as to the voltage across the main generator and the current being supplied by the generator to the traction motors. The sum of these signals from the transductors is compared with the closely regulated 74-volt output of the auxiliary generator. Remember that the only voltage that the load regulator knows about is the 74 volts it gets from the auxiliary generator. The PLR has an advantage. It knows at all times the values of voltage across, and the current flowing from, the main generator.

"When an unbalanced condition develops between the 74-volt signal from the load regulator arm and the feedback signal across the PLR coil, the flow of current in that coil will operate to open or close its contacts. When the feedback signal exceeds 74 volts, the current flow in the PLR coil opens its contacts to cut in a re[illegible] reduces the strength of c[illegible] reactor drive windings. T[illegible] duce the field excitation [illegible] generator.

"When the feedback si[illegible] is l[illegible] than 74 volts, the flow [illegible] PLR coil is reversed and [illegible] close. This shunts out a re[illegible] creasing flow of current t[illegible] drive winding. This will [illegible] field excitation of the mai[illegible]

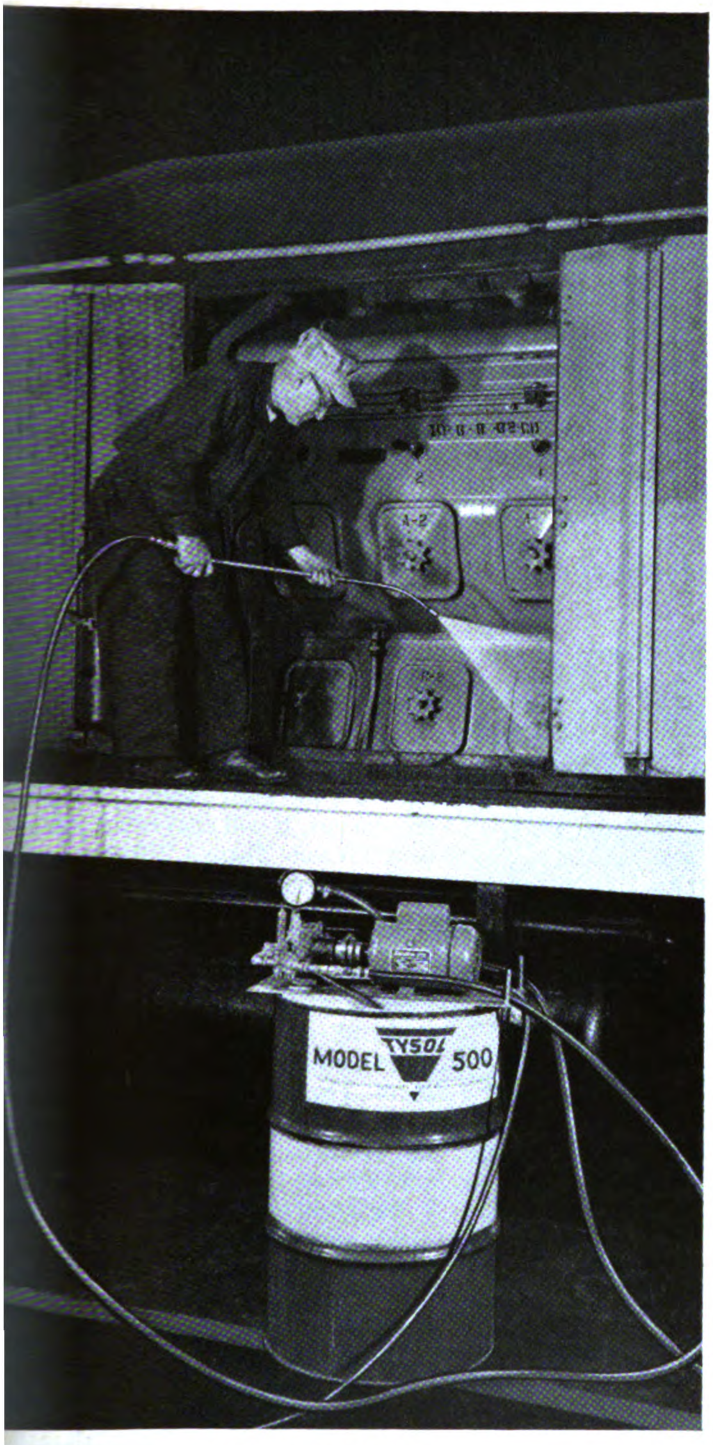
"While the load regul[illegible] has principal role in adjustin[illegible] current fed from the ma[illegible] fier, its action is modified [illegible] PLR. though PLR has the final [illegible] matter, it acts only after [illegible] feedback signals that ar[illegible] being supplied by the volt[illegible] and rent transducers. You [illegible] see this is a highly refined c[illegible] designed to produce at e[illegible] of operation the power [illegible] suited to the prevailing c[illegible]

"If you refer to the ar[illegible] block diagram, you can see at a g[illegible] the relationship between the co[illegible] nents and tell which one is ass[illegible] the other. Is this much clear?"

"Yes," said Joe, "but I'm a bit [illegible] fused about the term 'magnetic a[illegible] fier' and the term 'transductor' [illegible] speaking of the voltage transd[illegible] and the current transductor."

"I don't blame you," Doc resp[illegible] ed. "It is a bit confusing. A tech[illegible] dictionary defines a transconduct[illegible] a 'magnetic amplifier, or a satu[illegible] core reactor.' The terms are use[illegible] terchangeably, but, in this case[illegible] builder refers to a magnetic amp[illegible] when he speaks of the device [illegible] furnishes exciting current to the [illegible] generator. It employs saturable [illegible] reactors which we find consist of [illegible] core magnet frames for mounting [illegible] a-c power coils and one d-c con[illegible] coil. A sketch of this type satur[illegible] reactor was drawn for one of our [illegible] cent instruction sessions, so you sh[illegible] be familiar with it. The term 'm[illegible] netic amplifier' is a handy one to [illegible] when speaking of the supply of exc[illegible] tion current. It also sets it apart fr[illegible] the saturable reactors that supply [illegible] feedback signals.

When speaking of the sourc[illegible] feedback signals, we referred to [illegible] rent transductors MGT-A and B[illegible] voltage tranductors GVT-A and [illegible] All of these transductors consist [illegible] saturable core reactors, but they [illegible] different from the reactors in the m[illegible]



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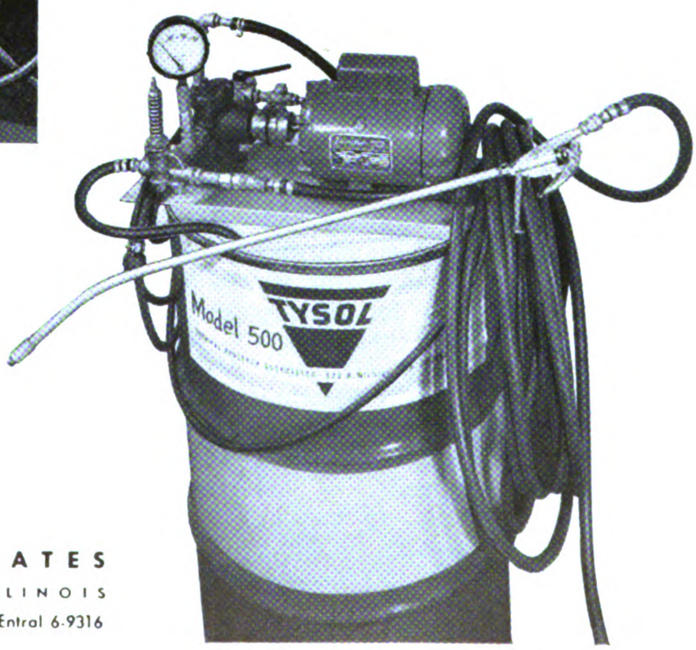

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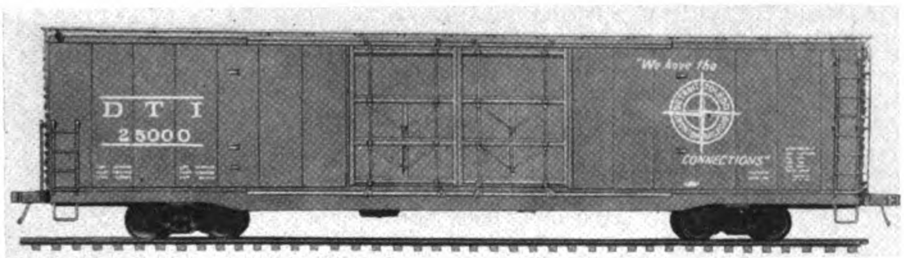
netic amplifier. The coils are not wound on three-leg core frames. I have drawn sketches which show a gapless iron core with an open window in the center. The winding on the MGT current transductor consists of an a-c coil wound on one side of the frame. The d-c winding consists of a strap copper bus bar that passes through the open window at center of core. This winding carries the main generator amperes. The flow of alternating current in the a-c coil is proportional to the flow of main generator current in the bus bar passing through the window of the core.

"The voltage transductors GVT-A and GVT-B are made of saturable reactors that have a core similar to the open frame gapless iron core used by the MGT transductors. In this case, however, the a-c coil is wound about one leg of the core frame, while the d-c coil is wound about the opposite core. The d-c coil is a voltage coil connected directly across the main generator. The current in this coil depends on the voltage output of the main generator. The flow of alternating current in the a-c coils of the voltage transductor reactors is proportional to the flow of direct current in the d-c coils. It follows that, if the current in the d-c coils is proportional to generator voltage, then the current in the a-c coils will also be proportional to the main generator voltage.

"The alternating current from these two sets of transductors is pa[ssed] through transformers, the outp[ut] which is rectified and added tog[ether] to form the feedback signals that [...] the PLR relay in the performa[nce of] its duty. When the feedback s[ignal] reaches PLR, the strength of the s[ignal] compared with 74 volts from the a[ux]iliary generator determines which [di]rection current will flow through [the] operating coil of PLR. Right the[re] when the decision is made whethe[r to] reduce or increase the generator [...] excitation, or to hold it at the exis[ting] level.

"Right here," continued Doc, "[is a] good place to wrap up this session. [If] you have further questions, we [will] have to take them up at another time.

RR Goal: Big Box Cars for Auto Parts



Prototype 60-footer is scheduled for completion soon at Greenville Steel Car.

Automobile-parts handling by railroads may soon be undergoing a change as radical as that which has been taking place in the railroads' transportation of assembled automobiles. As has been the case in the movement of new autos—where specialized multi-level equipment has brought the railroad share from less than 10% to an estimated 33% in a few years—freight cars tailored exactly for the handling of parts could spark another revolution.

High-cube, high-capacity and smooth interiors are apparently the characteristics which auto manufacturers are seeking in forthcoming equipment. A major revision which has been made in rates for movements of auto parts to their widely dispersed assembly plants, auto makers feel, must be accompanied by a change in freight cars supplied them.

Ford Motor has been very active in pushing for new box cars for parts service. At the end of June, the Wabash was scheduled to receive the first 85-ft ACF box car for Ford parts service following its testing at the ACF Technical Center in St. Charles, Mo. In mid-July Greenville Steel Car will probably begin delivery of 60-ft cars to the Detroit, Toledo & Ironton and other roads for Ford parts service.

A year ago, Ford, Santa Fe and Pullman-Standard built a 9,500 cu ft cushioned "container" for low-density parts loading. In May, the Southern Pacific unveiled an 86-ft 5-in. box car with 10,000 cu-ft. capacity, from Whitehead & Kales (RL&C, June 1963, p 48). Ford, ACF and Wabash (with SP and Louisville & Nashville also participating) are bringing out the 85-ft, 10,000-cu-ft car.

Meantime, at least four builders—ACF, Greenville, Pullman-Standard, and Thrall (plus the Santa Fe Topeka shop)—are working on 60-ft cushioned cars to handle the high-density components going into the auto industry's 1964 models. At last count, more than 850 60-ft cars were on order specifically for auto-parts traffic.

As yet, no orders have been placed for 85-ft parts cars. But Ford has indicated it will need about 2,700 for [...] movements. It will also need 2,00[0] the 60-ft cars. These 4,700 cars wo[uld] replace about 9,000 40-ft and 50-[ft] cars now in Ford service. A projec[tion] for the entire auto industry points [to] a market of 15,000 to 20,000.

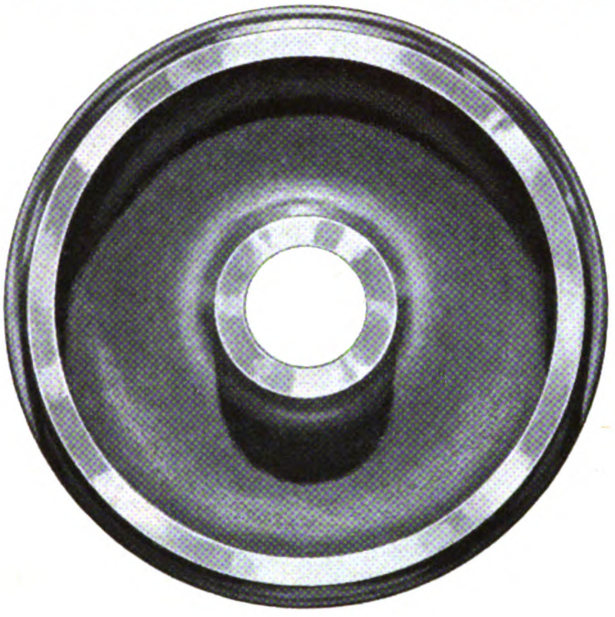
Ford plans to abandon the [...] standard car-code system where [a] given car is outfitted to handle speci[fic] parts. The new cars will be, as Direc[tor] of Traffic Eugene S. Knutson pu[ts] it, "clean on the inside"—plain bo[x] cars with no interior fittings.

Parts will be containerized. Load[ed] at the parts plant, they will move un[touched] in containers to assembl[y] line, perhaps half-way across th[e] country. Containers will be loaded [to] the eaves.

If containerization were the o[nly] object, Ford might have switche[d] over, using the existing auto-parts ca[r] fleet. But the auto maker is also look[ing] for maximum loading and maxi[mum] utilization of equipment. Exis[ting] cars do not have the loadi[ng] capabilities Ford requires. Material[s] handling engineers have been pushin[g] a container design program which w[ill] produce a basic rack and accessori[es] for holding most stampings. P[arts] can then be containerized as th[ey] come off the presses. This will elimi[nate] rehandling in plants and in trans[it]. At the same time, only two types [of] cars will be required—one for hig[h]-density ladings and the other for low-density parts.

THE TOUGHEST ANIMAL IN AFRICA IS THE CAPE BUFFALO

THE TOUGHEST WHEEL IN RAILROADING IS THE GRIFFIN



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What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Cleaning Exhaust Valves

Are there any methods of cleaning exhaust valves for EMD engines other than hand buffing?

Initially, we used hand buffing for cleaning valves. Because of the numerous disadvantages of that method, consideration was given to other more desirable techniques. The field narrowed down to two other cleaning possibilities:

- Particle blasting method;
- Tumbling abrasive method.

Both have highly desirable characteristics. It was only the variety of the valves—the different sizes and weights—that led to selection of the particle blasting method. A conventional dry type sandblasting machine is used for this operation, using silica sand as the blasting medium. Our machine is Model AC-2448 which was shop modified to accommodate additional dust filters. This method is efficient and economical. It also has an added advantage, inherent in particle blasting, of relieving the skin or surface stress of the valve.

K. Pruchnicki, supervisor locomotive maintenance, Southern Pacific.

Improving Engine Cooling

What can be done to obtain better cooling fan and shutter control on 2,400-hp Alco units?

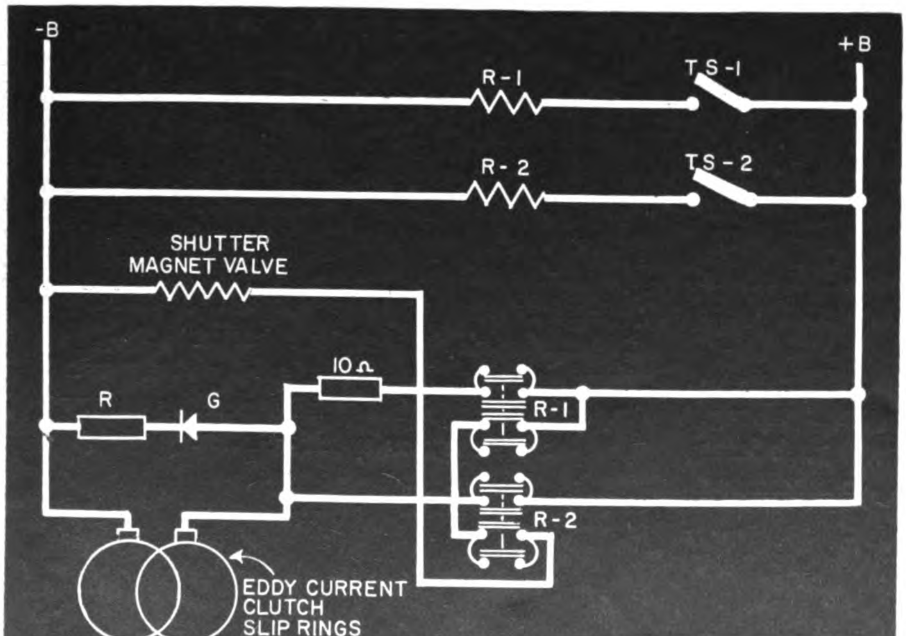
Reference is made to the LMOA Diesel Engine Maintenance Committee's 1962 report (LMOA 1962 Bulletin, Vol. 1, p 76) which describes the modification of cooling controls on Alco freight units. This modification was made on 1,800-hp units and is believed to represent an improvement.

A new solution to the Alco cooling problem appears to be the Hartzell cooling fan. A Hartzell cooling fan was installed on Alco passenger unit 244 on November 10, 1960. Reasons for this test were:

- Failures of conventional fan blades;
- Failures of fan drive shaft couplings;
- Desire to increase air flow when ambient temperature is high.

The Hartzell fan has six blades which are adjustable up or down to desired degree of pitch. Both hub and blades are corrosion-resistant aluminum alloy. The hub is cast with self-contained blade housings threaded to admit blades. Shaft bore is machined and keyed and is tightened on the shaft by means of tension bolts. Blades are also cast and threaded. Blade pitch adjustments to meet air delivery needs are made by simply loosening the bolts. Markings on hub and blade shank indicate setting of degree. The Hartzell fan weighs 110 lb in comparison to the Alco fan weight of 469 lb.

The passenger unit was placed on load test with regular Alco cooling fan while shutters were blocked in open position and fan on low speed. Twenty velocity readings of ½-min duration were taken. With the conventional fan running at low speed, average air velocity was 1,118 ft per min.



The temperature switches TS-1 and TS-2 are both Part 8144368. TS-1 is set to close at 145 deg F and to open at 140 deg F. TS-2 is set to close at 155 deg F and to open at 150 deg F. The resistor R is Part 8004683. The rectifier G is Part 8158951. Material cost for these parts is estimated at $69.40, and the labor for this conversion at $28.70. Alco shutters are spring loaded to remain normally open. This diagram appeared in 1962 LMOA Proceedings.

Test Results

The conventional fan was removed and the Hartzell fan applied. The blade tip angle was 19½ deg for the test. The engine was placed on load test under full load conditions, and a similar test was run. The Hartzell fan produced an average air velocity of 1,820 ft per min. The fan was locked in at high speed and the engine overcooled, so no reading was taken.

This fan has been in service for the past two years without giving any trouble. The locomotive has operated in high ambient temperatures with 170 deg water temperature, while other locomotives in the same consist, with conventional fans, had water temperatures of 185 deg. There have been no failures of drive shaft coupling or eddy-current clutch coupling.

G. W. Niemeyer, mechanical superintendent, Southern District, Missouri Pacific.

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AAR Sets Higher Standards; Demands on Equipment Grow

New requirements formulated at the recent business session of the AAR Mechanical Division have been aimed at assuring that future freight cars will operate satisfactorily under anticipated service conditions. At the same time the organization has acted to change some maintenance practices and eliminate certain existing car components from interchange service so that today's car fleet will operate with greater reliability and less attention.

Extensive changes are planned for the AAR Interchange Rules and in AAR Specifications. Some of these will be incorporated in the Interchange Rules revision due August 1; others will be effective on January 1, 1964. Because of the mandatory nature of the standards, practices and prices imposed by Mechanical Division regulations, including its Interchange Rules, it was considered essential to hold the limited business session in Chicago in advance of the formal annual meeting of the Mechanical Division which will be on October 11, 1963, in conjunction with the American Railway Progress Exposition, also in Chicago. Actions taken in October could not be submitted for the required letter ballot and completed in time to become effective on January 1, 1964. During the business session on June 25 and 26, plans were announced for the annual meeting in October (see box).

Car Design Fundamentals

Design criteria for freight cars of larger capacity and completely new designs are being prepared by a special Mechanical Division "task force" made up of C. C. Leriche, assistant engineer of car design and construction, Southern Pacific; F. Fahland, retired general mechanical engineer, Union Pacific, and W. A. Bostian, shop engineer, Norfolk & Western. This group has been surveying and updating existing Mechanical Division design fundamentals covering cars of conventional arrangement. At the same time it has been preparing new standards for cars of higher capacity and those incorporating unusual design features. While working with other Mechanical Division groups and with the AAR Research Department, the task force has also been meeting with carbuilders and with car-part manufacturers.

Among the factors which will be spelled out in the standards being prepared are the applications of design loads to cars and their distribution through the car structures. Stress analysis methods will be incorporated along with the allowable stresses for various construction materials. Theoretical calculations will be tempered with empirical results obtained through testing at the AAR laboratory and at carbuilders' facilities. "Adherence to these specifications as minimum requirements in the design and construction of freight cars will be mandatory for all cars intended for unrestricted interchange service," the Committee on Freight and Passenger Car Construction commented.

The rapid introduction of cars of "new and untried types" has received special consideration from the Car Construction Committee over the past two or three years. A specification for the testing of these cars has been prepared in cooperation with the task force and will be presented for letter ballot later. Already the Car Construction Committee is requiring a standard set of data from all those seeking approval for new types of cars in interchange service (see page 50). Interchange Rule 3 requires such approval.

While the General Committee has reported that the 5% increase in allowable rail loads, in effect since January 1, 1963, has had no detectable effect on freight cars, there is some concern over the pres[ent] standard black-collar freight-c[ar axle]. Cracks detected in up to 5% of [the] wheel seats inspected resulted in [a] Laboratory investigation which sh[owed the] area to be highly stressed under [the] higher axle loading. This has led to [a] ballot proposal that the black-co[llar axle] be reduced to AAR alternate stan[dard, in]tended for cars in light service, a[nd that] the new AAR standard axle be the [raised] wheel-seat design with machined [fillets] between seats. The raised-wheel-se[at axle] is presently the AAR alternate stand[ard].

The gradual elimination of the [cast] wheels from freight cars in inter[change] service is proceeding in what the G[eneral] Committee calls an "orderly manner." [No] more such wheels are to be manuf[actured] after 1963, and their use in interc[hange is] to be prohibited after 1967. "There [have] been some failures of steel wheels [on cer]tain roads and the interested comm[ittees] now have this under investigation," [the] General Committee reported. Action [is be]ing taken to prohibit the use of re[condi]tioned secondhand truck springs for [use on] interchange freight cars. Certain [cast] side frames with high incidence of [failure] will also be banned on interchange c[ars].

The Mechanical Division, accor[ding to] F. Peronto, executive vice chairman, [is] challenging those car owners not c[arrying] their share in maintaining the fre[ight car] fleet. He cited the investigations m[ade last] year on some roads which had poor [car] records and reported that recommen[dations] made by the AAR resulted in impro[vement]. Another matter of concern to the G[eneral] Committee is return to service of o[bsolete] and unsuitable freight cars which ar[e some]times acquired by secondhand deal[ers and] resold for regular interchange opera[tion].

Journal Performance

Even though journal lubricators a[re] applied to practically all interchan[ge cars] with solid bearings and a steadily g[rowing] percentage of the devices are "appr[oved"] types, there has recently been a dete[riora]tion in journal performance. Whil[e the] General Committee had predicted tha[t it] should see an average of over 1,00[0,000] miles per hotbox set off after 1962's re[cord] 942,637 miles per set off, the early m[onths] of 1963 have been a matter of conc[ern]. Latest data indicates performance in Ap[ril] 1963 was poorer than that in April 19[62]. The Lubrication Committee is currently [at]tempting to confirm the indications [that] renovated lubricators are primarily re[spon]sible. If this is the case, the next step sh[ould] be to determine if pads could opera[te 36] months without cleaning. With the pre[sent] cost of lubricators and a 36-month re[pack] period, it would then be possible, and e[co]nomical, to prohibit renovation—requ[iring] that lubricators be scrapped after one [36-]month service period. Already plans are [be]ing formulated to put such a plan into e[ffect] if the investigation by the Lubrication C[om]mittee does show the preliminary conc[lu]sions to be correct.

Of the 38,105 freight cars built in 19[62], 64.3% were equipped with roller bear[ings]. This was up from 1961 when 57.8% of [the] 30,714 cars built that year had roller be[ar]ings. At the end of 1962 there were 121,3[..] railroad-owned and private freight c[ars]

Annual Meeting in October

The annual meeting of the AAR Mechanical Division will be held October 11, 1963, in Chicago's McCormick Place. This will be during the week-long American Railway Progress Exposition which is serving to bring together the annual sessions of practically all the trade, shipper, and supply groups in the railway industry. Most of the formal business of the Mechanical Division, normally transacted during a three-day annual meeting in June, was conducted at last month's limited business session in Chicago.

Principal speaker will be A. E. Perlman, president of the New York Central. The General Committee is planning to follow Mr. Perlman's address with presentation of three topics vital to the design and maintenance of future rolling stock. The subjects, featured by panel discussions, are to be:

- **The Ideal Locomotive—a topic permitting railway officers and builders to specify the motive-power characteristics which are of greatest importance to mechanical departments;**
- **Fundamentals of Car Design—discussion of a current activity of the Mechanical Division which has been termed "one of the most significant things the AAR has ever done;"**
- **Rolling Stock Developments, Foreign and Domestic—an opportunity to learn of current and future equipment and the services in which it may be used.**

Chairman of the Mechanical Division is J. A. Welsch, general superintendent motive power, Illinois Central. Vice chairman is J. H. Heron, assistant vice president—equipment, New York Central.

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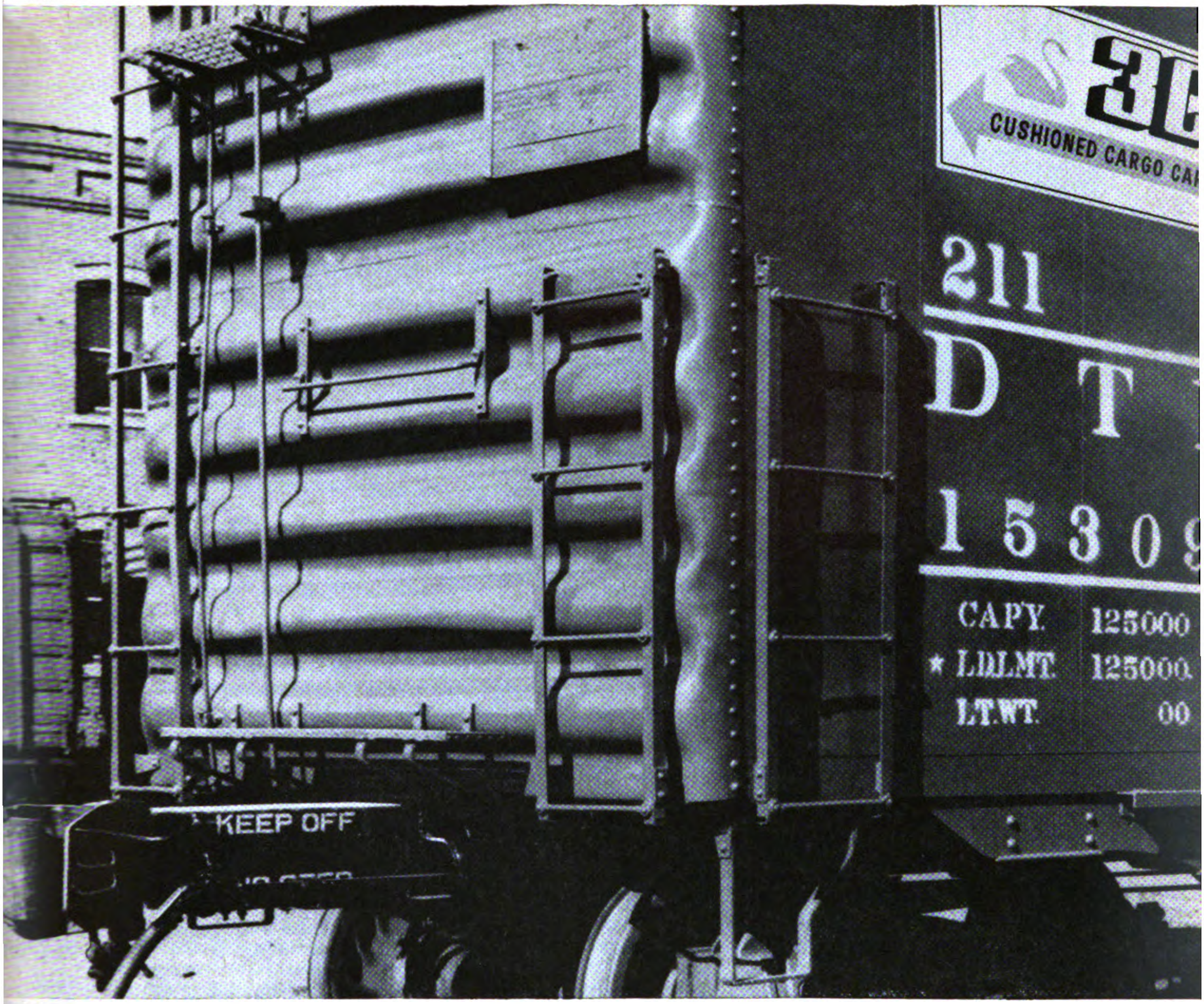

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AAR Report

fitted with roller bearings in the U.S. and Canada. The Mechanical Division is devoting increased attention to roller-bearing cars involved in derailments. It is now required that such cars have bearings removed and inspected and that the axles be placed between centers and swung to determine if they are bent. J. W. Hawthorne, Atlantic Coast Line chief mechanical officer, stated that there can be serious trouble if roller bearings are not checked.

The growing number of cushioning devices for freight cars has resulted in a proposed specification covering their mechanical characteristics, sturdiness, and testing. The specification covers all arrangements which incorporate travel in excess of 5 in., thus excluding those cars having conventional draft gears. The cushioning device, for AAR test, must be installed on a 70-ton box car. Allowed to roll freely, it will be subjected to impacts of a striking car in 2-mph increments until a 500,000-lb coupler force is developed. This will rate the cushioning capacity. A similar series of tests with the cushioned car backed up by other cars will rate the load-carrying capacity of the sill. These tests will proceed in 2-mph increments until a coupler force of 1,250,000 lb is achieved.

Activities of some of the Mechanical Division committees are indicated in the following reports. The proposed changes for the Interchange Rules also represent the activities of some of these committees.

Fueling Nozzle Standardization Sought

Standardization of connections used with the five automatic fueling systems now available, a survey of methods for controlling locomotive spark emission, and ways to substitute grease for oil in roller-bearing journal boxes of locomotives are all projects of the Committee on Locomotives and Locomotive Fuels and Lubricants.

Manufacturers of automatic fueling devices have formed an Automatic Diesel Locomotive Fueling Manufacturers Committee on Standardization at the request of the Locomotive Committee. The committee has held two meetings in recent months. Standardization of fueling connections would make the various systems compatible, meaning that it would then be unnecessary for railroads to use adapters when different types are involved.

Of 80 railroads responding to a Locomotive Committee questionnaire, 25 reported they are almost, or completely, equipped with automatic fueling devices; 23 roads are testing them or contemplating tests, and 32 roads have no present plans. Roads regularly using, and others testing, have rather evenly divided their preferences among the five systems available.

To determine methods for controlling diesel locomotive sparking, the Committee surveyed 71 railroads. Railroads owning 27,893 units are represented. Of these, 7,584 are equipped with wire-netting spark arresters and 3,639 have other types. Fuel-oil additives have been used to control spark emission from exhaust stacks by 17 of the 71 railroads. Seven reported satisfactory results.

A test procedure for evaluating diesel locomotive exhaust manifolds incorporating internal spark arresters has been drafted by the Spark Arrester Sub-Committee of the Society of Automotive Engineers Engine Committee. The AAR Research Department is reviewing this procedure to insure that its requirements are compatible with railroad operating conditions.

Conversion of Hyatt oil-lubricated roller bearings on locomotive journals has been studied by the Committee. Standard 6½- x 12-in. roller bearings of Timken and SKF types have long been lubricated with greases complying with AAR Specification M-917-60. Conventional Hyatt bearings are normally lubricaed with Specification M-905-56 car journal oil. To simplify servicing, work has been done to make it possible to use grease in Hyatt bearings.

Two methods have been tested by Electro-Motive. Tests of new rear journal-box covers having special seals were made on different types of locomotives. This proved impractical because the inability to maintain proper lubricant level resulted in rapid thrust unit wear. Next development was a new type of thrust unit which could operate without continual applications of grease to the box. It had to be completely interchangeable with the basic bronze thrust unit. The new design consists of two flat radial rows of needle bearings mounted in the same plane between inner and outer races. The entire assembly is enclosed in a housing quite similar to that used with the bronze unit. It can be applied in Hyatt JMRA boxes having the rubber cushioning.

Excellent bearing performance is reported, although final evaluation has not yet been made because tests are continuing.

Still to be determined are the proper lubrication schedules for the different services. Presently 2 lb of an approved AAR roller-bearing grease are added to each box at six-month intervals or when wheels are turned. For high-mileage locomotives, 2 lb of grease are added at 60,000-mile intervals.

Water-cooled air compressors are gaining popularity. Milwaukee tests showed water-cooled air-compressor heads could give results comparable with completely water-cooled compressors. The Southern applied test heads on an F-7 unit late in 1962. Now the road has set up a program of applying several sets each month. The Northern Pacific is conducting its own tests to compare compressors which are air cooled with those which have water-cooled heads only, and with those that are completely water cooled. For complete water cooling, it appears that the most attractive type is that involving external connections between the water-cooled head and water-cooled cylinder. This precludes the chance of water entering cylinders or crankcase, a risk involved directly with connected-head and cylinder-water passages. A question has been raised about loss of engine cooling water should external compressor cooling-water piping fail. While there is this hazard, it is not felt to be materially different from failures possible in the internally connected, completely water-cooled type. Work on rotary air compressors and hydrostatic drives for reciprocating types has been abandoned.

Two compressed-air drinking-water coolers on one road have been reported in their second year of operation with no failures. Maintenance is confined to quarterly cleaning of the air passages.

The Locomotive Committee recommends the use of break-in lubricating-oil filters after any major work is performed on the engine or the oil system. Reusable perforated metal-screen lube-oil filters are being used both in EMD and Alco locomotives. On the Alco locomotives an individual, reusable filter is applied in place in the oil piping at each main bearing. Full-flow, pleated-paper elements applied in regular filter housing have been found to make a good break-in filter. A large number of railroads have adopted this practice since it will give finer filtration than screens and the cost of the pleated-paper filter is moderate.

Gas Turbines

Stationary tests of the UP 4,500-hp experimental coal-fired gas-turbine-electric locomotive (RL&C, January, 1963, p. ...) using coal and oil were made at Omaha, Neb., between December 1961 and October 1962. On October 17, 1962, the locomotive made its first trip in revenue service, operating exclusively on coal. From October to November 15, the locomotive operated over 3,000 miles. At the end of this period it was held for bucket inspection. Serious bucket erosion was occurring, due largely to frequent plugging of the Dunlab ... blowdown pipes used for flyash removal.

Overcoming of this plugging, caused disintegration of the interior insulation and radiation shielding in the separator, was attempted with a new shielding of heat ... material. Both stages of turbine buckets and nozzles were replaced. The locomotive is again in service and has operated satisfactorily for several months.

The 30 8,500-hp and 18 of the original 25 4,500-hp UP gas-turbine-electric ... continue in service. By the end of 1962, when the oldest units had been in service over 10 years, total fired hours of both 4,500-and 8,500-hp units was 1,20... practically all on residual fuel. The 8,500-hp units operate primarily between Council Bluffs, Iowa, and Ogden, Utah. Six of the 8,500-hp locomotives have been equipped for multiple-unit operation with ... diesel units. With three 2,400-hp diesel-electrics, a locomotive of 15,700-hp is produced. Tests have shown that this amount of power is required for handling high-speed freight trains. Several of the 8,500-hp locomotives have been upgraded to 10,500-hp gas-turbine output, electrical equipment limit...

The 8,500-hp gas turbines on the ... averaged 9,865 miles per month in ... and produced 17.1% of the freight ... ton-miles. By the end of 1962, the first ... operated 536,376 miles since entering service in 1958. The average number of ... hours per turbine for 1962 was 4,13... on 31 power plants, including one ... The 4,500-hp GTE units made less ... during 1962 than in previous years ... they were stored during slack ... Seven were retired.

(Cont...

Interchange Rules Are Being Revised

Numerous changes have been recommended for the Interchange Rules for freight cars by the Committees on Arbitration and Prices for Labor and Materials. It is probable that the next revision, due August 1, will incorporate most of them. No major changes are proposed for Passenger Car Rules and none for TOFC Rules. Principal revisions are shown, identified by rule number, section and paragraph in that order, unless otherwise specified.

Rule 2-g-3 and 4. Rule pertaining to the transfer of lading from defective cars received in interchange modified to clarify the intent by requiring that notification of car condition be made to owners with the form letters shown on page 350 of the 1963 Interchange Rules.

Rule 3-a-9. Modification would permit acceptance in interchange of cars equipped with AAR alternate standard raised-wheel-seat axles and the complete prohibition in interchange of cars with the former alternate standard tubular axles after 1963 because sufficient time has elapsed to permit their removal.

Rule 3-c-1. New fourth paragraph, a letter ballot item, would prohibit cars having couplers with 5- x 7-in. shank in interchange service after January 1, 1968. The unsatisfactory performance of these couplers led to this recommendation by the General Committee and the Committee on Couplers and Draft Gears.

Rule 3-f-3. Modification would extend mandatory date for the application of lading strap anchors on flat cars in interchange service by one year to January 1, 1965.

Rule 3-g. Modification would require that the 2¼-in. floors and adequate floor supports previously specified for box cars built after 1956 be applied to all box cars rebuilt after January 1, 1964.

Rule 3-i. Addition of new section, a letter ballot item recommended by the Committee on Freight and Passenger Car Construction, would require structures of all cars built new or rebuilt after January 1, 1964, to be of such strength that portions of the car extending beyond the rails, preferably the ends of the body bolsters or side sills, can be jacked so as to remove the trucks with jacks in position.

Rule 3-j-1. Modification permits use of AAR alternate standard and approved equivalent designs of journal bearings on cars in interchange, and modification of note following would permit acceptance in interchange of cars having cartridge type journal bearings.

Rule 3-t-3-f. Addition of paragraph, a letter ballot item recommended by the Committee on Freight and Passenger Car Construction, would prohibit the use in interchange of cars having those truck side frames which have records showing a high incidence of failures.

Rule 9. Modification of note following first heading "AAR Couplers or Parts Thereof" would provide a charge for type E 6¼- x 8-in. coupler with 25-in. shank and CF-79 couplers with 36¼-in. shank. Modification of first, third and sixth items under "Wheels and Axles" heading provides for information which must be shown on billing repair cards. Modification of note under heading "Journal Bearings Applied" clarifies intent that the type of bearings applied and removed must be stated.

Rule 10-a, b, d. Modifications bring sections into agreement with current status of various types of cast-wheel and wrought-steel wheels.

Rule 10-d-2. Modification provides for protection of wheels other than 33-in. diameter when used on freight train cars equipped for passenger service and on freight cars of over 100 ton capacity.

Rule 10-d-5. Addition of new paragraph provides protection for the use of raised-wheel-seat axles when car is so stencilled.

Rule 10-f-1, 2 and 3. Addition of new paragraph provides for the disposition of experimental wheels which have not yet been advanced to AAR standard and eliminates the wheel substitution table.

Rule 11-d-2. Modification establishes removal and replacement of bolted journal stops as the responsibility of the party who is applying the wheels.

Rule 16. Modification of eighth paragraph provides for experimental wheels which have been advanced to AAR standard.

Rule 17-q-4-d. Addition of new paragraph reading "When roller-bearing equipped cars are returned to owners after having been derailed and handling line has not dismantled roller bearings for inspection, car owner may bill handling line 0.7 hr labor for dismantling, inspecting, and replacing each roller bearing, as well as material charge for replacement of roller bearings found damaged in addition to applicable wheel labor." This makes it possible for owners to be reimbursed for inspections made after cars have been derailed.

Rule 17, Interpretation M-8. Modification provides for substitution of plain bearing wheels and axles in place of cartridge type journal-bearing wheels and axles and for disposition of parts removed.

Rule 19, Item 4. Modification would prohibit use of wedges other than AAR standard and alternate standard.

Rule 25. Modification of first paragraph would eliminate necessity for holding side frames cast prior to 1946 for owners disposition because return of these is seldom being requested.

Rule 30, Interpretation 4. Modification would bring the light-weighing example in compliance with the current 48-month mandatory period.

Rule 32-10-a. Addition of new second paragraph establishes "delivering company" as responsible for expenses involved in dismantling, inspecting and reassembling roller-bearing assemblies on cars which have been derailed.

Rule 35. Entire rule would be deleted because the charges for closing hopper and drop doors on open-top cars received in interchange have been eliminated.

Rule 56, Item 11. Addition of new item to assist in reducing excessive brake-pipe leakage provides for the mandatory replacement of air-brake hoses over 8 yr old when air-brake COT&S or in-date testing is performed. Same requirement made effective by addition of new paragraph U to Rule 60.

Rule 60-a-1. Modification would permit COT&S attention for AB air-brake equipment after 45 months for any car on repair track and would authorize the shopping of empty cars for this sole purpose after 45 months.

Rule 66-j. Modification provides for the scrapping of journal bearings having badly battered sides and lugs while eliminating the requirement for scrapping those bearings which have only a narrow strip spread over the sides at the corners.

Rule 66-A-c. Modification provides for use of a pressure gun calibrated in ounces for the lubrication of grease-packed journal roller bearings so that the proper quantities of grease may be added.

Rule 66-A-1. Addition of new section requires stenciling of new lubrication date required by Section d for journal roller bearings, when all wheels on both trucks are changed for any reason, because bearings on new wheel sets would be fully lubricated.

Rule 66-B-c. Addition of new second paragraph provides for periodic lubrication of cars having cartridge type journal bearings within ten days prior to expiration date stenciled on car, applying the same principle previously established for plain and roller-bearing assemblies.

Rule 84. Modification of second paragraph clarifies the intent by including AAR alternate standard raised-wheel-seat axles.

Rule 86-c. Addition of new second paragraph provides for the remounting of second-hand wheels on AAR alternate-standard raised-wheel-seat axles when wheel seat is not more than ⅛ in. in excess of standard diameter.

Rule 86. Addition of new Table 2 provides a reference covering AAR alternate-standard raised-wheel-seat axles.

Rule 101. Item codes 6101 through 6128 covering substitution of lubricators for loose-waste packing eliminated because this is no longer necessary. Table 15 modified to include one additional device conditionally approved and 3 journal lubricators eliminated.

AAR Report

Improved Coupling Will Be Tested

An air-hose coupling which has a positive cast stop instead of the coupling pin would be an AAR alternate standard if a letter ballot item of the Committee on Brakes and Brake Equipment is approved. The air-brake manufacturers developed the new design which also has a groove or channel on the clamping area of the shank of both the coupling and nipple. Laboratory tests at elevated and sub-zero temperatures showed this design superior to the present straight shank. Manufacturers have been authorized to offer 7,500 car-sets of these couplings.

A specification is being prepared for a better adhesive for bonding fittings and air-brake hose so as to minimize the leakage that presently develops in extreme cold weather. At present, one such new adhesive is available.

Great Northern ore cars equipped with Type AC freight brake equipment for 64 months were inspected. All cars passed the single-car test. Valve portions tested satisfactorily on an AB rack. Portions which were disassembled were found in good condition, being clean and with no evidence of any wear. Lubrication was satisfactory. The slide valve and slide-valve seats did not appear to have much lubrication, but a film of oil was present and no wear had occurred.

Approximately 1,500 car sets of high-friction composition brake shoes have been placed on interchange freight cars having conventional brake rigging. Of this total, about 300 car sets have been in service over two years. No adverse reports on performance have been received. Over 60 sets of low-friction composition shoes have been placed in service on interchange freight cars having conventional rigging. These low-friction shoes are directly interchangeable with the conventional AAR standard metal brake shoe. Approximately 2,200 car sets of Wabcopac brake assemblies with high-friction composition shoes have been placed in interchange.

In 1962 the Committee emphasized the need for eliminating unnecessary bends, right-angle fittings, and excessive hose lengths which increase brake-pipe volume and restrict flow of air. For freight cars of 65 ft length and over, the air-brake manufacturers have now developed simplified vent and quick-service valves. Authority has been granted for application of these valves to 2,000 interchange cars.

Approximately 10,000 diaphragm conversion kits for existing AB service portions have been applied to cars in interchange. Air-brake manufacturers have also been authorized to manufacture 350 ABD service portions which incorporate the brake-cylinder release function, accelerated release feature, and the diaphragm piston. They will mount directly on the present AB pipe bracket. The ABD service portion is intended for use when new valve portions are purchased. The General Committee has given permission for application of 7,500 ABD portions for service trial performance, making it possible to determine whether the valves will perform satisfactorily for the present 48-month cleaning period or longer.

Wheel Designs May Be Inadequate

Numerous reports of steel-wheel failures in freight service have come to the Committee on Wheels and Axles. Some result from manufacturing defects, but a large number, usually classed as unknown causes, are failures in the plates or junctures of the plates and hubs. Heavier wheel loads and higher speeds, the Committee feels, may by themselves be sufficient reasons to question present wheel designs. Other factors that could be overstressing of wheels are the lateral loads applied in retarders and high dynamic lateral loads applied by frogs and guard rails. Thermal stresses could be a factor when combined with some of these.

Solution of this problem, the committee believes, involves inspections and non-destructive tests at manufacturers' plants, along with research directed at measuring stress levels statically and dynamically. A sub-committee will set up a program for inspection of new wheels. The AAR Research Center is surveying member roads to establish the pattern of failures. The committee feels it desirable to make stress-coat and strain-gauge studies on wheels in service so as to determine the soundness of plate designs. Discussion indicated that one-wear wheels may most frequently be involved.

During the past two years approval was given for many new car-wheel designs to provide a range of diameters and rim thicknesses that would satisfy the requirements of modern car design. Specifications provide chemical and physical properties that meet present-day requirements. Because of this evolution, the committee reports that present wheel charges in the Interchange Rules are not applicable because it is extremely difficult to distinguish between one-wear, two-wear and multiple-wear wheels when service metal is worn off or the rim thickness is decreased. This is being studied by the Committee on Wheels and Axles and the Arbitration Committee.

Proposed designs of 38-in. one-wear cast-steel and wrought-steel freight-car wheels for four-wheel trucks have been submitted to the Committee on Freight and Passenger Car Construction. A letter ballot will seek elimination of standard and temporary wrought-steel wheel designs A-50, IX-33, GX-36, JX-36, KX-36, AX-42, and BX-44 because a survey of manufacturers and member roads indicates they are no longer in demand. All experimental cast-steel wheels (except AAR-X7) and all experimental wrought-steel wheels have now been made standard, or their manufacture has been discontinued.

In the next revision of the Wheel and Axle Manual those items having reference to roller-bearing and plain-bearing axles will be separated. Rule and paragraph identifications will show "PB" for plain bearings and "RB" for roller bearings.

To increase the fatigue resistance of journals, the Committee recommends the standard procedure for cold rolling bearing axle journals be included in the revision of the Wheel and Axle Ma "Adequate roller pressure must be used the process to be effective. A hard steel roller having a contact face ground a radius of 1⅜ in. plus or minus 0.0 to be used. A pressure of 1,400 lb be applied. The roller should be overall diameter and 2⅜-in. in Where a roller suitable for both plain roller-bearing journals axle is desir may be the diameter used for plain-b journal rollers and 1½ in. in width. face of the roller nearest the journal must be 1$^{3}/_{16}$ in. from a plane through the center of the radius of the ing surface.

"A transverse feed of $^{1}/_{32}$-in. max should be used; rolling may be done either direction. Roller pressure should applied or released within a ¾-in. length the outer end of the journal surface, depending on the direction of rolling. Rolled face at the fillet end should extend point such that the face of the roller is with the end of the dust-guard seat for nals having a 1½-in. fillet radius.

"The roller should be mounted hardened pin and bushing or on a roller bearing. Opposed rollers are recommended to avoid excessive radial force the lathe centers. A device to indicate roller pressure is recommended. If device is not used, an approximation roller pressure can be obtained by a torque wrench on the roller cross-feed hand Torque to produce the required roller sure is determined by forcing opp rollers against the journal surface un $^{3}/_{32}$-in. minimum contact width is obtain Axle should not be rotated when torque measurements are being determined. During rolling, the journal must be coated a suitable lubricant."

A new rule on journal-surface fin for inclusion in the Wheel and Axle Man ual, a letter ballot item, will read: "The face roughness of journals of roller-be axles must not exceed 63 microinches ground. If rolled, the turned finish not exceed 63 microinches, and the finish must not exceed 16 microinches dust-guard seat, when used with a rub seal, must be turned to a maximum finish 125 microinches and rolled to a maxim of 16 microinches. When not used for purposes, it may be machined to 125 mi inches maximum.

"The surface roughness of journa roller-bearing axles must not excee microinches when ground. If rolled turn finish must not exceed 63 microinches and the rolled finish must not exceed microinches. Taper on journals shall exceed 0.01 in. A file must never be on journal surface or fillet. A file may used to break the sharp edges of the end dust-guard seat."

A new rule covering a check of bearing axles for bent condition has recommended as a letter-ballot item. vides for checking the runout at both of a journal simultaneously, using two indicators when the roller-bearing axle mounted wheels is rotated between cente The axle shall be scrapped account the readings of the dial indicators at site ends of the same journal differ by

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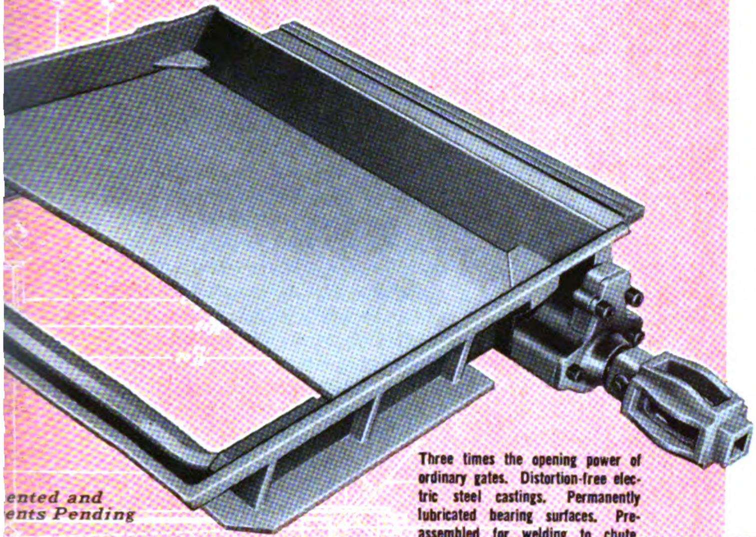

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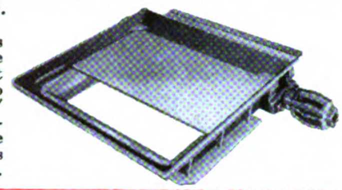

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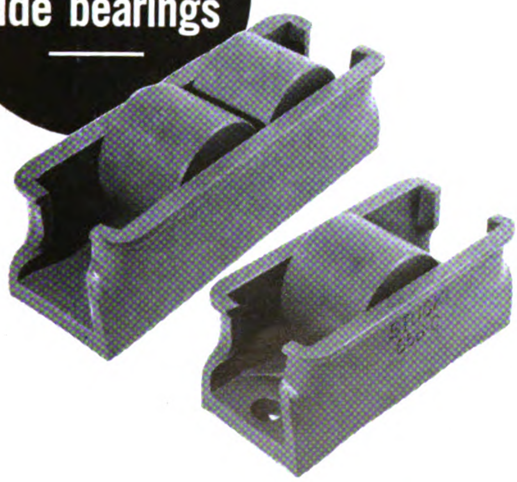

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Product Reference 43C

AAR Report

than 0.005 in. during one full revolution of the axle. Both journals are to be checked. For unmounted axles, neither the journals nor wheel seats may run out more than 0.005 in. total dial indicator reading.

A recommendation from a Car Department Officers Association committee that step sizes for turning journals be abolished did not meet the approval of the Committee on Wheels and Axles and the AAR Research Center. In a few instances where excessive turning of journals is considered wasteful of labor and materials, an Interchange rule permits reducing journal sizes 0.045 in. below G-1 and G-3 sizes and 0.125 in. below the G-5 size. About 1957 a field study made of axles scrapped showed only 25.3% scrapped because of journal diameter, while 41% were scrapped because of excess length. This, the AAR Research Center reports, would not indicate that any appreciable extension of service life could result from elimination of step sizes. Further, at a time when every effort is being made to improve solid bearing performance, elimination of step sizes could decrease the mileage per hotbox set off.

Better Journal Performance Is Goal

Design, servicing and inspection changes which, over the past few years, have rendered all types of axle journal bearings more reliable continue to receive the attention of the Committees on Journal Roller Bearings and Lubrication of Cars and Locomotives.

The Roller Bearing Committee reported that, at the end of 1962, there were 96,266 railroad-owned and 25,014 privately owned freight cars equipped with roller bearings. Application of lubricating devices to solid-bearing-equipped interchange freight cars is virtually complete, and the Mechanical Division has ceased to report the number of such installations as part of its monthly hotbox report. Currently under study is a method for determining the quantities of individual lubricators which are in service. The present method, in which car owners' reports of installations serve as the basis, will be continued. Considered also were such methods as spot checks at major terminals and reports of types and quantities of pads processed by reclamation plants.

With the cooperation of member roads, private car lines, and suppliers, the General Committee expects that "a record considerably in excess of 1,000,000 car-miles per hotbox set out should be achieved during 1963. The 1962 average was 942,637 miles per setoff (RL&C, May 1963, p 46), 2½ times better than that of 1961. "It has been generally agreed," the General Committee continued, "that the present solid-bearing assembly and lubrication medium are such that there is a real potential for achieving an annual record of 2,000,000 car-miles per hotbox set out."

Flat-back bearings, now an AAR alternate standard, have been applied by many railroads and are reported to give "very good" service. Similar reports are coming from roads which have applied the AAR-designed "Hi-Hat" journal bearing.

No reports have indicated that present standard and alternate standard solid-bearings cannot operate for 30 months—the current "repack" period. The AAR Research Group did, however, examine 2,607 bearings taken from cars which had been shopped for periodic lubrication attention or other reasons. Based on this, it has been recommended changes in Interchange Rule 66-j-5.

Changes in the conventional journal assembly also involve control of axle movement, the lubricating medium, and oil seal. The Lubrication and Specification Committees presented for letter ballot a new specification M-920-63, Car Journal Stops, Centering and Control Devices. These devices would be required to pass a prescribed AAR laboratory test to qualify for limited test approval from the Lubrication Committee. An original allotment of not more than 500 car sets could, with Committee sanction and satisfactory road service, be expanded.

For a journal stop to receive conditional approval, it would have to have a minimum of 18 months service under at least 3,000 interchange cars with no more than 30 hotbox set-outs per 90,000 car months of active service. The device would have to operate without any replacement except on those cars developing adverse journal conditions.

Those journal stops to be considered for approval should perform satisfactorily for 60 months, after at least 3,000 cars are equipped in interchange service.

Nine centering devices have been authorized for limited application, and additional designs are being laboratory tested. To investigate performance, car owners are submitting information on these journal-stop applications similar to that previously required for journal lubricators.

A standard lubricator, which would meet all requirements of Specification M-918 is being developed by the AAR Research Department. Periodic quality checks are being made of existing lubricator designs. Reports have been received concerning the hardening and flattening of lubricator cores, both in service and during storage. This is being investigated in cooperation with member roads and commercial pad manufacturers and renovators. A survey has shown that lubricators which perform satisfactorily in freight service do not always do so when put in passenger cars. This, the Lubrication Committee reported, indicates the need [...] "a specially approved group" for them [...]

Rear seals for solid-bearing journals [...] continue to be investigated. The specifica[...]tion for the conventional dust guard [...] the phrase "and to retain the oil" [...] because this was regarded as the fun[...] of a more sophisticated device. It has [...] rewritten to permit use of plastic de[...]

Roller Bearings

Extended lubrication periods are [...] investigated on practically all journal r[...] bearing designs. Inspections of bea[...] and grease have been made after se[...] periods ranging from two to five years [...]

Roller-bearing greases have been a m[...] of great importance. Bearing manufactur[...] sought a heavier grease for the majority [...] their grease-lubricated designs. Grade [...] with a penetration of 290 to 320, has [...] authorized for this purpose. Grade A [...] 370 penetration) is required for H[...] passenger-car bearings having thrust bloc[...] Stated quantities are to be applied to be[...]ings, and it is now required that calibra[...] grease guns be available for this purpose.

It has been recommended by the Rol[...] Bearing Committee that, if one roller in [...] set be found to have defects which requ[...] its discard, a complete set of matched rol[...] be installed to maintain the proper ra[...] and lateral clearances. It has also been su[...]gested that Interchange Rules be altered [...] require that the locking plates which re[...] the endcap cap screws be replaced and [...] reused at any time they are removed.

To improve performance of the adapter[...] used with roller bearings in truck [...] frames, a series of design changes have [...] been made. Most of these changes involv[...] the thrust shoulder on the adapter. It is als[...] recommended that the Wheel and Ax[...] Manual specifically prohibit the lifting [...] mounted wheel sets with the rope or slin[...] looped outside the wheels and over th[...] roller-bearing assemblies. This has bee[...] found to damage seals and seal cases as th[...] sling slips along the bearing surface dur[...] lifting.

The Roller Bearing Manufacturers En[...]gineering Committee and the Roller Bearin[...] Committee have found that there would [...] no mechanical difficulty in operating bea[...]ings of different designs on the same ax[...] Such a procedure might cause some difficu[...]ty with hotbox detectors which compa[...] temperatures at the two ends of the a[...] since different bearing designs might ope[...]ate at inherently different temperatures.

Car Specifications Reflect New Condition[...]

Freight cars which are larger, heavier and more highly specialized are being introduced with increasing frequency. Seeing no end to these trends, the Committee on Freight and Passenger Car Construction is working to make AAR standards, many developed for smaller general-service cars, applicable and useful for today's rapidly changing designs. In this it has been working with the special "task force" on Fundamentals of Car Design (see above). The Committee on Couplers and Draft Gears is also cooperating closely.

Standardization of the locations for an[...] cocks on cars of exceptional length has be[...] pushed during the past year. Latest indic[...]tions are that the ICC may not give its [...]proval to the location proposed for cars [...] 80 ft and over having sliding sills and T[...] E swivel-shank couplers. The mounting [...]neath the sliding sill has been rated the m[...] practical from a mechanical standpoint.

Cushion underframes, increasing in pop[...]larity, have been the subject of a cooperat[...] investigation by the AAR and the Penns[...]vania (RL&C, May 1963, p 20). Inves[...]

·d have been the following sliding-sill, raulic draft-gear, and floating-tube ar- gements:

ing Sills	*Travel, in.*
Freight Saver	18
Hydra-Cushion	20
Shock Control	20
Gliding Sill	24
Hydroframe	30
Iraulic Draft Gear	
Freight Master	9
Hydra-Buff	12
uting Tube	
Barber Cushion Tube	7
Barber Cushion Tube	10

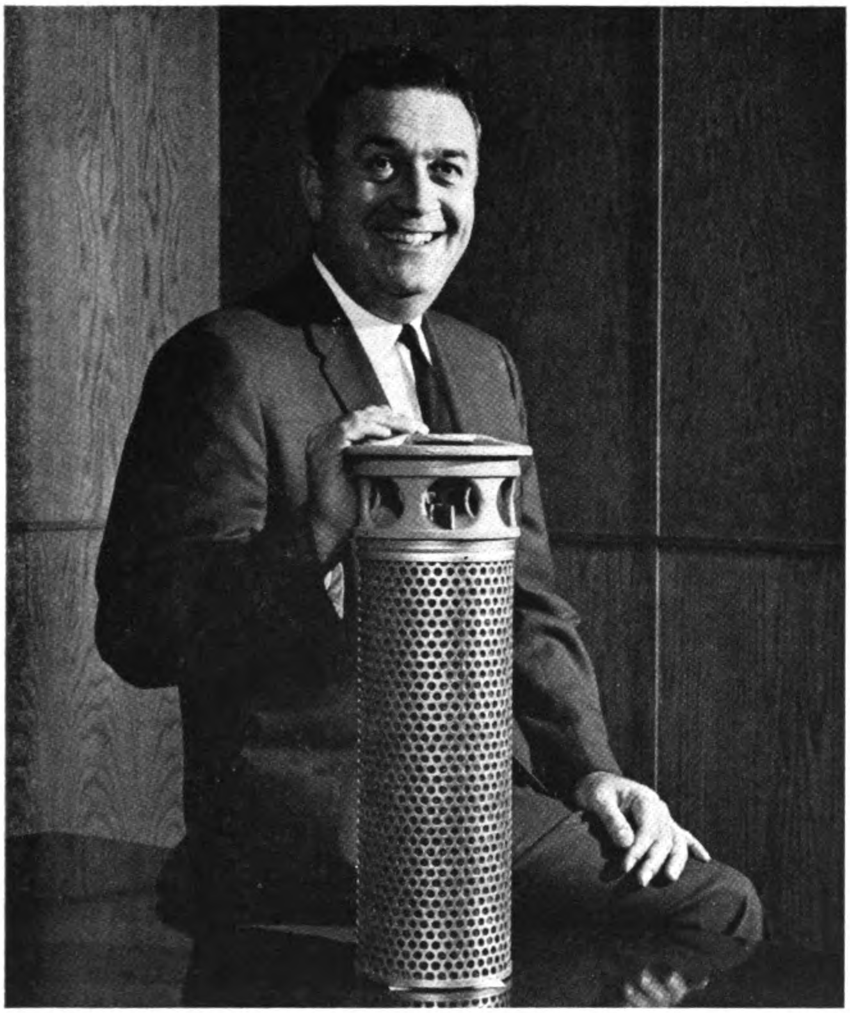
ome additional devices have been pro- ed. It is anticipated that several hy- ulic and friction draft-gear arrangements to be introduced next year. Typical of current authorizations for applications these devices are: Freight Saver—3,000 s; Freight Master—2,200 cars; Gliding —1,110 cars, and the Hydra-Cushion—)00 cars.

The Committee on Coupler and Draft ars is investigating the failures occurring interlocking lugs on the knuckle side of Type F interlocking couplers used on ight cars. Causes of these failures have been positively determined, and the up is seeking information from railroads periencing them.

"There have been repeated derailments, ne serious, caused by failures of truck e frames due to fracture, flaws and pro- ssive defects," the Car Construction mmittee reported. Much time has been ent determining which designs are weak obsolete. It is now proposed that no side mes cast prior to 1926 be used on cars ilt after 1961. In addition, a series of ecific models, some of more recent manu- cture, are being prohibited in interchange. Repeated failures of box-car doors, used by absence of an arrangement to pre- nt the door from falling from the car, ve been experienced. Top safety hangers d reinforcement of the door post and side- l connections, now an AAR standard, are quired on new cars built since 1960 and e to be required on all cars interchange 1966. Frequent occurrences are causing e Car Construction Committee to consider tting a date earlier than 1966 for applica- ns to existing cars.

Unloading of bulk-commodity cars with akers and vibrators is causing a great deal damage. One road reported that damage 24 covered hopper cars of various owner- ips after just one unloading would cost out $80 per car to repair. The subject has en discussed with car-builders and manu- cturers of the shake-out devices with no al solution. It is recommended that rail- ads urge their customers to use car akers only during the unloading process d never operate them on empties.

Multi-level racks and tie-down devices ap- ied to piggyback cars for transportation of w automobiles have been the subject of uch work. Tie downs were standardized st year. Annual automobile model changes ake necessary revisions of these devices, d this work is now complete for 1964. On cks, it is reported that many require close spection and frequent maintenance. The roup which standardized the tie downs is ow preparing specifications for removable nd permanent racks.



Personal Mention

G. M. Beischer
B&O

J. J. Dwyer
C&O - B&O

R. E. Baker
MeC

L. S. Crane
PRR

Akron, Canton & Youngstown.—*Akron, Oh*
H. L. BULLOCK, superintendent moti
power and cars, appointed assistant gener
superintendent. Former position abolishe

Baltimore & Ohio.—GEORGE M. BEISCHER ap
pointed chief mechanical officer, succee
ing ELMER A. KUHN, retired. A sketch o
the career of Mr. Beischer, at the time o
his appointment as assistant chief mechan
ical officer appears on page 45 of the No
vember 1962 issue.

Burlington.—*Chicago:* R. E. TAYLOR, gener
superintendent motive power and equip
ment, appointed chief mechanical office
succeeding J. D. REZNER, mechanical a
sistant to vice-president, who has retired.

Canadian National.—*Toronto, Ont.:* D. M
BRESSETTE, research engineer, appointe
superintendent of equipment, Toronto Are
J. J. HARRIS, special assistant-car, appointe
assistant general superintendent equipment
Great Lakes region, succeeding G. L
GALLOWAY, retired (RL&C, June, p 61
Saskatoon, Sask.: BERNARD GASIOR ap
pointed superintendent of equipment, Sas
katchewan area, succeeding J. L. SMITH, re
tired. A. V. MILLS appointed assistant super
intendent of equipment, succeeding LAW
RENCE WOROBEY. Mr. Mills formerly as
sistant supervisor of motive power at Win
nipeg, Man. *Dauphin, Man.:* LAWRENCE
WOROBEY appointed superintendent o
equipment, Hudson Bay Area, succeedin
Mr. Gasior. *Moncton, N.B.:* W. E. DANTER
appointed general superintendent of equip
ment, Atlantic Region, succeeding H H
HICKS who is retiring because of ill health
Mr. Danter formerly assistant general su
perintendent of equipment, Atlantic Regio
Chesapeake & Ohio—Baltimore & Ohio.—
Huntington, W. Va.: J. J. DWYER appointe
chemical engineer, responsible for coord

g the planning and implementation of rams in the area of water analysis and ment, including its application in lo- ›tives. Mr. Dwyer, formerly chief iist, C&O System, is also chairman, t Is Your Problem Committee, Loco- ve Maintenance Officers Association. *more, Md.:* Headquarters of K. T. ›, general manager, motive power and ›ment, moved from Huntington to B&O ing, 2 North Charles st., Baltimore.

ıgo Transit Authority.—*Chicago, Ill.:* L. ›ON ANDERSON appointed superintend- of shops and equipment, succeeding ›H N. JOBARIS, deceased. *Skokie, Ill.:* ER H. REICHARD, superintendent of ;, succeeds Mr. Anderson as superin- :nt of rapid transit shops and terminals.

e Central.—*Portland, Me.:* ROY E. R, general manager, named vice presi- —purchases, stores and mechanical, :eding HARRISON M. RAINIE, vice presi- —purchases and stores, who is retiring. r. Baker entered railroad service in as air-brake instructor and supervisor ıtomatic train control on the Boston & ıe, advancing through various mechan- positions until 1945 when he became rintendent car maintenance of the [, MeC and Portland Terminal. Sub- :ntly he was assistant general manager e three lines, and later became general ıger—mechanical, and general man- of the MeC and PT. Mr. Baker is ac- ›n AAR Mechanical Division Commit- and has been a member of the Coordi- l Mechanical Associations, Eastern Car man's Association, New England Rail- Club, and Manhattan Air Brake Club.

›uri Pacific.—*St. Louis, Mo.:* G. R. JACK- appointed superintendent car depart- , succeeding H. S. MARSH, retired. Mr. son formerly assistant superintendent lepartment at Houston, Tex.

ıylvania.—*Philadelphia, Pa.:* Effective ber 1, STUART T. SAUNDERS, president e Norfolk & Western, becomes chair- and chief executive officer of the PRR, :eding JAMES M. SYMES who is retiring /ill continue as a director and chairman e Executive Committee of the Board. TANLEY CRANE, appointed director of ıtrial engineering. Mr. Crane formerly ant chief mechanical officer of the ıern at Washington, D.C.

Fe.—Mechanical Department head- :ers, Eastern Lines, located at Argen- Kan. Mechanical superintendents at ıgo and Topeka, Kan., and general :r mechanic at Newton, Kan., trans- d to Argentine. *Topeka, Kan.:* WIL- D. MAJOR, supervisor of mechanical ıng, retired. GLENN E. RODGERS ap- ed general supervisor of mechanical ng. JOHN M. CULBERTSON, assistant ·visor of diesel engines at Needles, Cal., eds Mr. Rodgers as supervisor of diesel ıction car, with headquarters at To-

OBITUARY

. **Newcomer,** 60, director of mechanical rch, Research Department, Association merican Railroads, Chicago, died June ıis home in Gary, Ind.

Supply Trade

MOTOR WHEEL CORP.—*Robert J. Derleth* appointed general sales manager for all industrial products manufactured by company's Lansing divisions.

CLEVELAND GRAPHITE BRONZE, DIVISION OF CLEVITE CORP.—Points for distribution of replacement engine bearings for EMD engines established in Dallas, Tex.; Los Angeles, Cal., and Sacramento, Cal.

SYMINGTON DIV., SYMINGTON WAYNE CORP.—*Robert V. Simpson* appointed sales engineer, Philadelphia district, succeeding D. W. Zimmerman, retired. Mr. Simpson formerly sales engineer, Railroad Specialties, Birdsboro Corp.

NALCO CHEMICAL CO.—*Walter J. Ryzner* appointed Midwest district representative, Transportation Division, with headquarters in Chicago.

ALCO PRODUCTS, INC.—*Charles T. Lathrop,* mechanical superintendent, appointed manufacturing manager, locomotive and engine division, with headquarters

C. T. Lathrop
Alco

R. D. Kennedy
National Carbon

at Schenectady, N.Y. Mr. Lathrop will be responsible for all manufacturing operations in the production of diesel engines at Auburn, N.Y., and assembly of diesel locomotives at Schenectady. St. Louis service shop also under his jurisdiction.

BALDWIN-LIMA-HAMILTON CORP.—*Donald Lade* appointed sales manager, Western Region, headquarters of which have been moved from San Francisco to Los Angeles. *John F. Kirkland* named manager of Western district, with headquarters in San Francisco. *Joseph Hagen* named manager of Southwestern district, with headquarters in Los Angeles. Mr. Lade previously general sales manager of company's Standard Steel Division.

NATIONAL CARBON CO., DIVISION OF UNION CARBIDE CORP.—*Robert D. Kennedy* appointed product manager, electrical and mechanical products. Formerly division sales manager, electrical and mechanical products, Chicago.

TIMKEN ROLLER BEARING CO.—With the completion of an improvement program at Canton, Ohio, over a six-year period, involving the expenditure of $7,800,000, all U.S. production of standard bearings, special bearings and all large bearings will be consolidated at Canton.

ARGO PAINT & CHEMICAL CO.—*W. Bradley Gilkey* appointed vice president and director of sales. Mr. Gilkey formerly general sales manager, Sparton Railway Equipment Div., Sparton Corp.

GREGORY INDUSTRIES, INC.—*Robert C. Friedly* appointed general sales manager. Mr. Friedly formerly product sales manager, Nelson Stud Welding Division.

SCULLIN STEEL CO., A DIVISION OF UNIVERSAL MARION CORP.—*W. C. Irish* appointed district sales manager, New York.

FREIGHTMASTER, A DIVISION OF HALLIBURTON CO.—Facilities moved from 1400 E. Berry st., to 424 W. Vickery Boulevard, Fort Worth 1, Tex.

DUFF-NORTON CO.—*Richard C. Custer* appointed district sales manager, St. Louis, Mo., area, representing both Duff-Norton Jack and Coffing Hoist divisions.

E. I. du PONT de NEMOURS & CO.—*Roy A. Robichaud,* appointed assistant products manager for industrial maintenance sales at Wilmington, Del. *Earl G. Syfert,* a chemist at Chicago, succeeds Mr. Robichaud as railway finishes sales representative in the Southeast at Atlanta, Ga.

ƆN RAILWAY EQUIPMENT CO.— ·*Lynch Associates*, Atlanta, Ga., named representative in the Southeastern ter- '.

ƆON-NATIONAL, INC. — *Odd B. ad* appointed manager-office sales at York.

JGH EQUIPMENT CO., A SUBSIDIARY (MINGTON WAYNE CORP.—*William K. on* named president, succeeding *Harry allberg*, retired.

PERS CO., WOOD PRESERVING DIV.— *olas P. Matro* appointed sales manager, ›urgh, Pa., district.

N WOOD STEEL CO. — *James F. rudden, Jr.*, appointed to newly created ion of manager, sheet sales. *Charles chmacher* appointed New York district manager, succeeding Mr. McCrudden. *ence G. McCarthy* appointed assistant ıger, sheet sales. *George M. Callanan* inted district sales manager, Philadel- Pa. *William K. Fozard*, previously a representative in Philadelphia, named ant manager, plate sales. *H. M. Fred- s* transferred from Conshohocken, Pa., 'hiladelphia district office as a sales esentative.

›port

(Continued from page 9)

ation over a 134-mile route that was of the former Virginian Railway with h N&W merged in 1960 (RL&C, July ', p 10).

ıe C-C electrics, being purchased at a of under $25,000 each, have ignitron fiers for conversion of the 11,000-volt nating current from the catenary to ːt current usable by their 600-volt trac- motors which are of the same type used liesel-electric locomotives. The 197-ton s were built by General Electric for the inian in 1956 (RL&C, Oct. 1956, p 77) n they were described as being similar group of 10 rectifier units built previ- y for the New Haven (RL&C, Feb. ;, p 57) except that they were designed low-speed, heavy freight service instead ıigh-speed passenger trains. Recently 10 passenger locomotives and 221 tiple-unit cars have been taking power ı the catenary over the New Haven's mile electrified route. Freights have ed behind regular diesel locomotives most through passenger trains behind 9 diesel-electric-electric locomotives &C, March 1958, p 29).

he 11 new locomotives, according to trustees, will replace 17 diesel-electric ght locomotives, "permitting an annual ng in maintenance costs of about $226,- ." The increase in operating costs, pri- ily for power, will be about $90,000 ually. The acquisition will defer, "until year or later," the need for buying ıigh-horsepower diesel-electric locomo- s at an estimated cost of about $1,750,- .

: will be necessary to reinstall some

catenary at Cedar Hill Yard and at Oak Point Yard in New York, along with repair of damaged overhead wire on the Bay Ridge line in New York. Total purchase price of the locomotives is $300,000, and an additional expenditure of $326,000 will be made to prepare them for service and to restore the overhead so that they may be used.

The New Haven's is one of three U.S. electrifications operated with 11,000-volt alternating current. The Pennsylvania has 671 route miles over which both freight and passenger trains are operated. The Reading has 84 miles in the Philadelphia area used only by its suburban m-u cars. Only other major electrified freight service now operated in the U.S. is over two sections of the Milwaukee Road, a 3,000-volt, d-c system, aggregating 655 route miles in Montana, Idaho and Washington.

Car Damage Notices Need Prompt Handling

Freight-car owners are not always being informed promptly about the partial or complete destruction of their cars involved in train accidents. Interchange Rule 112, which requires this, is sometimes disregarded completely, or the notice is so delayed that owners and shippers are greatly inconvenienced when privately owned or specially assigned cars are involved.

Under certain circumstances, according to F. Peronto, executive vice chairman of the AAR Mechanical Division, car owner must furnish a statement showing the AAR depreciated value; in certain other cars, this depreciated value is estimated by the handling line. Regardless of whether the car's value is computed by the owner or handling line, it is the intent of the rules and regulations that the car owner be immediately notified of the fact that his car has been in an accident and that it will be out of service for a period of time, Mr. Peronto explained. Private line cars are usually operating in assigned service and, when such a car has to be delayed for repairs or disposition, it usually means that the owning company must arrange to obtain a substitute car so as to satisfy the requirements of its customers. The same thing has become true of certain railroad cars which operate in special service.

It is extremely important that the handling railroad promptly report to the car owners cases where private line cars are involved in a train accident and advise them whether the cars are loaded or empty, how badly they are damaged, and such other details as might be helpful so that the owners can contact their customers and possibly send a representative to the scene to assist in disposing of the lading and the damaged car.

Railroads are being urged to issue the necessary instructions to all of the forces who handle wrecks and other accidents.

In another action involving handling-line damage to cars, Mr. Peronto has warned that Interchange Rule 4a concerning defect cards on such equipment is not always being observed. Rule 4a requires that "in case of damage to a car for which the delivering line is responsible, such line must attach defect card to cover. No alterations may be made to defect card except by company issuing same or, in cases of partial repairs, as outlined in Rule 5. Defect cards cannot be repudiated. If only a portion of the unfair usage damage is repaired, defect card for the remainder of such damage must be applied prior to release of car."

Some railroads and private car lines have reported to the AAR that this rule is not being followed when cars are damaged in unfair usage and then are released without making repairs. In one recent complaint, it was mentioned that a car, which had been damaged in unfair usage and actually billed to the owners shop for repairs, arrived at the home shop without carrying any defect card from the road which damaged the car.

Such failures usually result in considerable confusion, correspondence, and delay. In some cases, it even unfairly penalizes the last delivering railroad where the identity of the damaging railroad cannot be established.

Forces concerned with disposing of foreign cars which have been damaged in unfair usage should make sure that defect cards are attached before the cars are released for service or sent home for repairs.

Design Data on New Cars Required by AAR Group

Design data on "new and untried" types of freight cars for which AAR Mechanical Division approval is being sought must now be submitted in a standardized manner. The Committee on Freight and Passenger Car Construction has indicated eight specific groups of information which must be submitted with such applications. Previously the Committee on Brakes and Brake Equipment had indicated the twelve items of information which are required for approval of the braking systems on new and untried cars (RL&C, 1962, p 48).

Data to be submitted to the Car Construction Committee includes:

- General arrangement drawings, specifications, and detail drawings showing the proposed construction if this is not fully disclosed in the general arrangement drawing;
- Stress calculations covering all important load-carrying members of the car;
- Estimated light weight;
- Clearance diagram superimposed on the critical cross section and end view of the car;
- Center of gravity location of the loaded car;
- General description of truck, including spring travel;
- Type of coupler with vertical and horizontal clearance between coupler shank and striker;
- Information indicating that the car conforms to the specified horizontal and vertical curvature.

The Committee on Brakes and Brake Equipment requires the following information on new freight-car designs: light weight; nominal capacity; rail load limit; lever ratio; braking ration; total air-braking force; total hand-braking force; drawings showing location of all parts of the brake equipment; location and group type of slack adjuster; type brake shoes, if other than AAR standard; size and number of brake cylinders; detailed location of angle cocks.

Trade Publicatio

(To obtain copies of publicati corresponding numbers on card page 50.)

42. SELF-HARDENING STEEL P Fabricated Parts Bulletin details u Man high carbon manganese ste nents in railroad and other in Manganese Steel Forge Co.

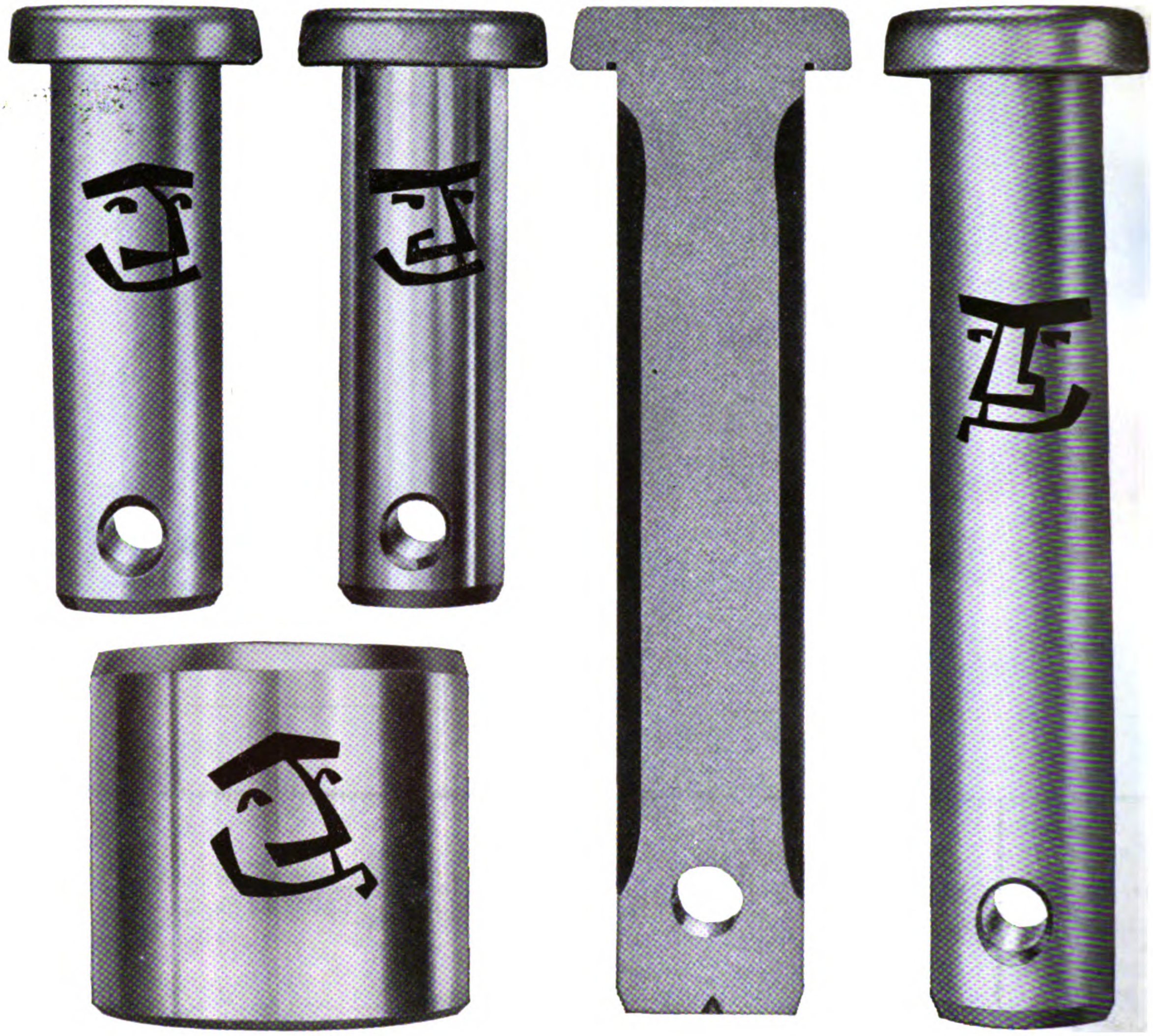
43. ALUMINUM CROSSME Folder gives information on "One- aluminum crossmembers used with Loader load protection systems for cars and trucks. Sparton Railway E ment.

44. FOAM WASHING. Cost-cutti vantages of foam for truck, bus an road car washing outlined in folder ing the combination of liquid de Oakite 74-L, and new foam-generati the Oakite Foamizer. Oakite Produ

45. SAFETY CANS. "Eagle Pre Safety" pictures uses of oily waste Type I safety cans, Type II safe dispenser cans, safety plunger cans bench cans, drain cans, and drip ca scribes operation of cans as well as tests. Eagle Manufacturing Co.

46. PLUGS AND RECEPTACLES letin 666 catalogs the heavy-duty S and Midget Triploc plugs, receptac mountings and accessories. Pyle-Na

Advertisers Index



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. . . page 46

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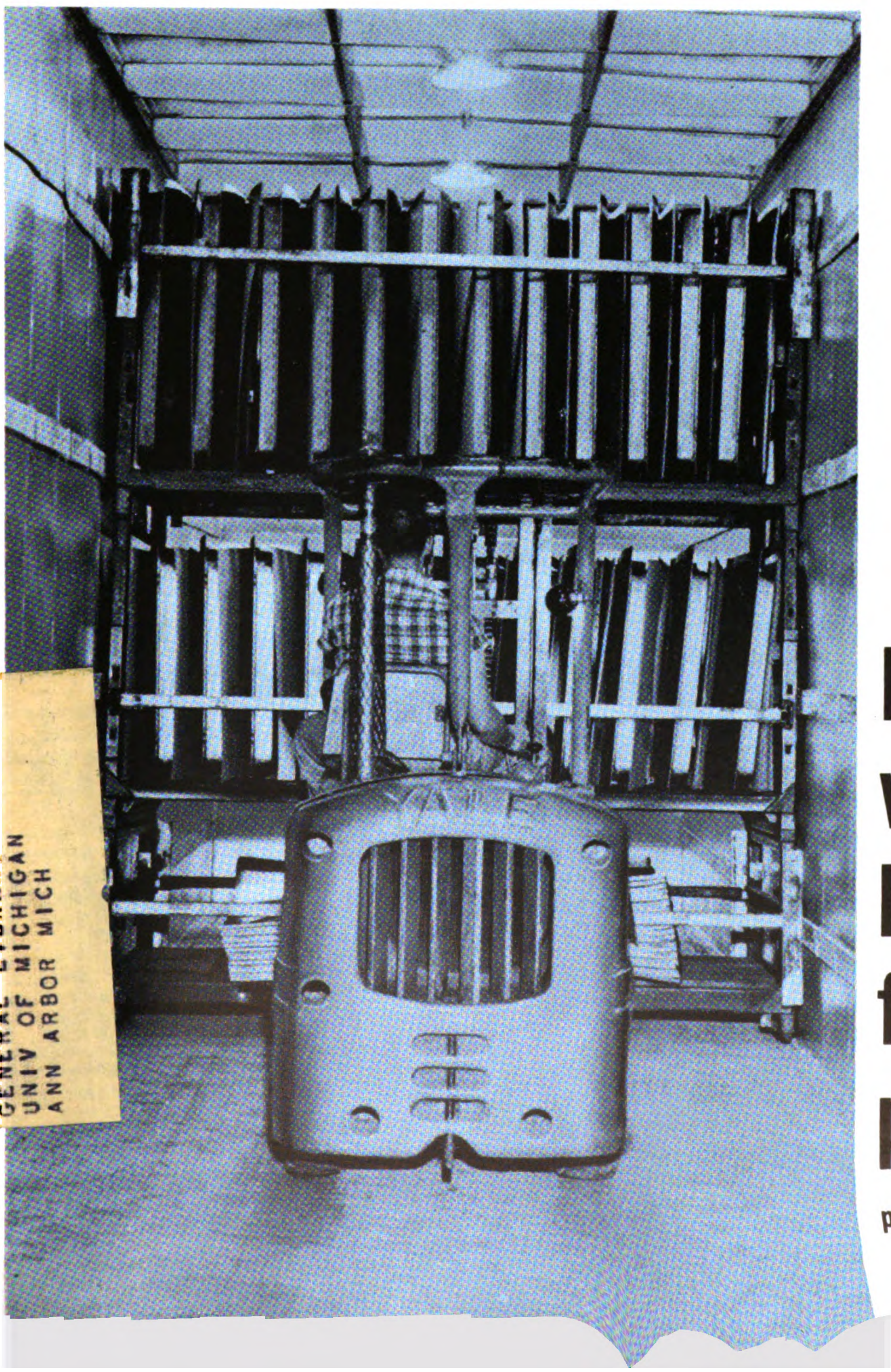
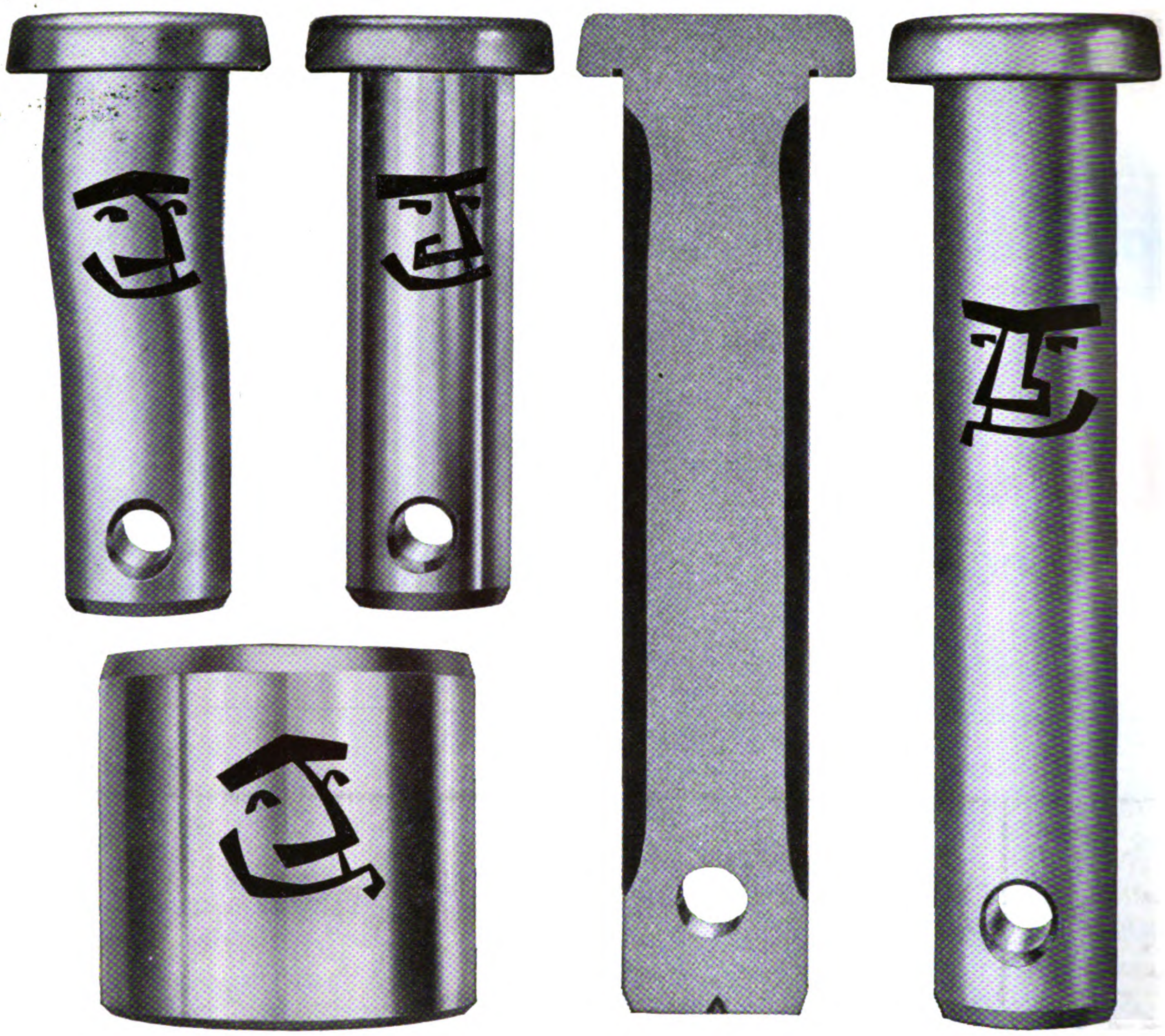


High and wide loading for auto parts

page 27



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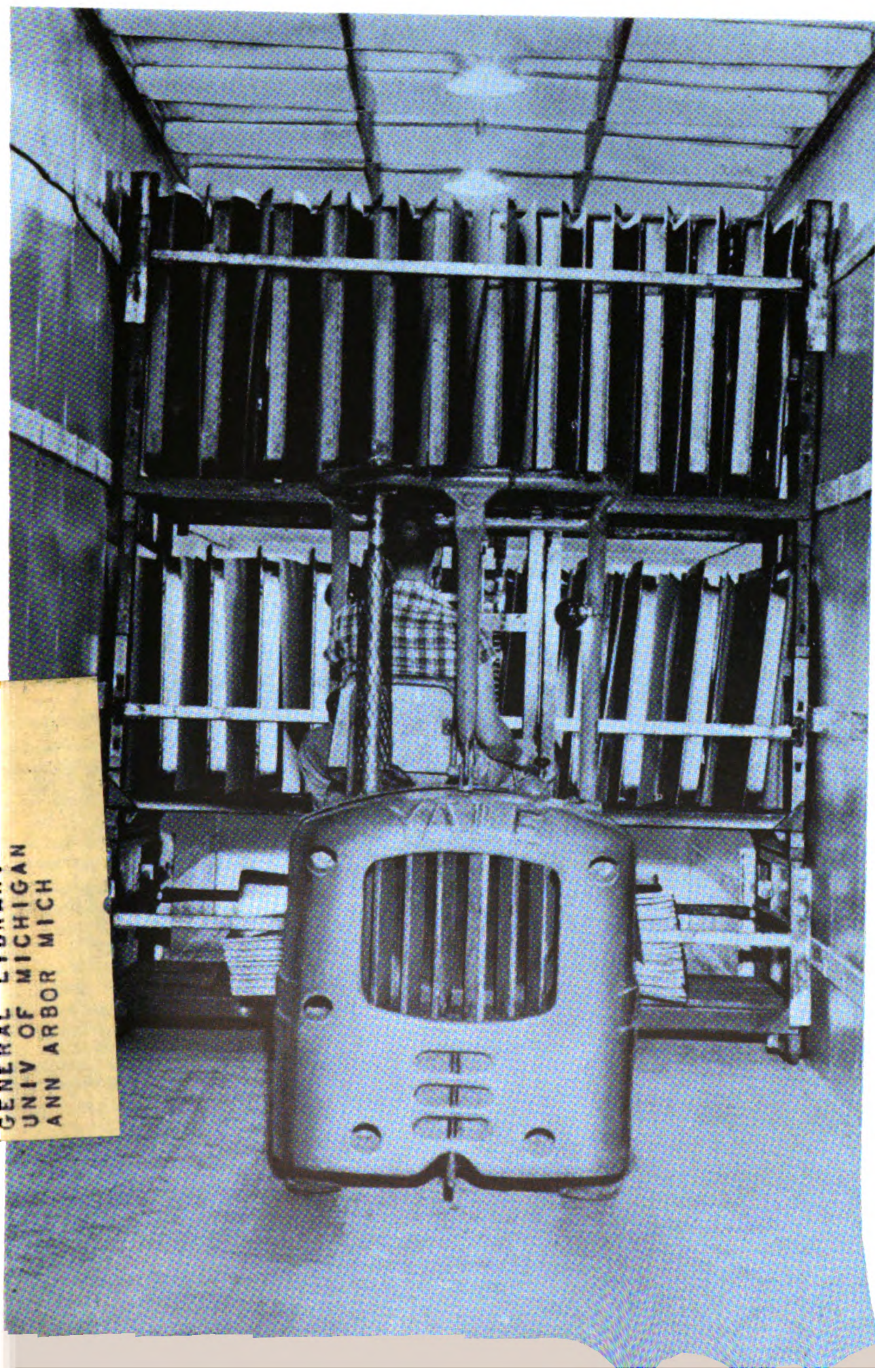

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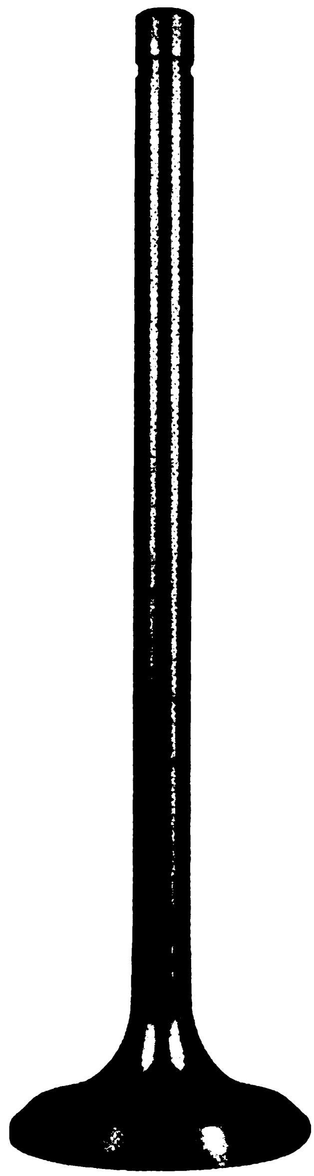
page 27

how much does a valve cost you?



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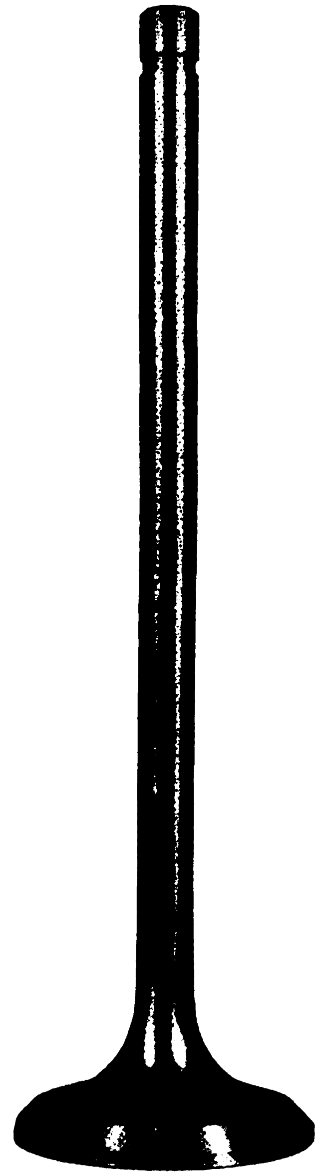

or $66.00?

he ALCO valve on the left costs $6.20. At the right—a ok-alike "bargain" that can cost $66.00 in labor and aterials if it fails prematurely. And the bill could go s high as $25,000.00—the cost of a complete engine verhaul—if the valve broke and dropped down into the ompression chamber.

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Report

Car Orders Increasing; Carbuilders' Share Grows

Carbuilders are in the middle of what promises to be a banner year. The 22,893 cars ordered by the end of May pointed to a year much like 1959 when 56,581 cars were ordered. Revised, unofficial estimates for the current year are in the 55,000 neighborhood.

The percentage of orders placed with the contract builders (as against the railroad and private line shops) has fluctuated sharply in recent years—from a recent low of 54% in 1955 to a high of 79% in 1956 when only 38,888 cars were ordered. But the percentage of orders placed with the contract builders as of the end of May represented about 75% of the total cars ordered. This rise reflects what some observers feel is an increasing inability of railroad and private line shops to cope with small orders for highly specialized equipment.

The 6,074 cars ordered in May represented the first time since 1959 that car orders for any month topped the 6,000 mark. Behind the steady rise in 1963 car orders are factors ranging from what some experts describe as the diminished role of the ordinary box car to the prospects for more realistic per diem payments, the pressure of increasingly severe car shortages, and the obvious need for more equipment to handle increases in traffic.

Shippers are predicting better times for the railroads in the third quarter of 1963. The 13 regional Shippers Advisory Boards are forecasting a 3.1% increase in total carloadings. While total carloadings for the year still trail 1962 figures, loadings made week-to-week gains and have consistently topped figures for comparable 1962 and 1961 weeks. In addition, total revenue ton-miles for 1963 are running well ahead of 1962 levels.

ACF's vice-president and general manager, Francis H. Boland, noting that the peak-and-valley ordering of large lots of cars no longer "has the significance to the carbuilder it once had," went on to point out that "the increased trend toward the specialized cars ordered in smaller lots is, in itself, helping to level out the purchasing pattern of the railroads." Mr. Boland noted that small lot ordering of specialized cars poses production problems for carbuilders.

Pullman-Standard's vice president of marketing, George L. Green, said: "The reason the railroads are buying more cars on the outside is because, in our view, the railroads need specialized cars in smaller lots. The railroads can't afford to tool up for these small runs of special cars. For instance, Pullman-Standard has spent millions of dollars in research and development to develop new types of cars to meet shipper needs."

Mr. Green's estimate of the factors behind the current surge in car orders: "First, railroad business is up because general business was up in the second quarter; secondly, the automotive industry is getting ready

(Continued on page 10)

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It has these unusual properties...

Flexibility: Insures an elastic bonded insulation system which maintains its moisture resistance by its ability to stretch and flex, and reduces cracking failures caused by thermal expansion and other mechanical stresses. See Figure 1.

Retained Resilience: Prolonged thermal aging in excess of one year at 300°F produces little change in hardness and resiliency.

Excellent Thermal Shock Resistance: It passes 10 cycles from 200°F to −55°F per Military Specification MIL-I-16923C.

Low Exotherm: Reduces curing stresses to a minimum. The resin is formulated to prevent runaway temperature, which otherwise occurs during curing process when the epoxy changes from a liquid to a solid, as shown in Figure 2.

Superior Thermal Stability: This resin qualifies in IEEE 180°C temperature classification. Note curves on chart.

High Dielectric Strength: ⅛th-inch thick cast sheet shows 670 volts per mil, using short-time method and 1,000 volts per rise.

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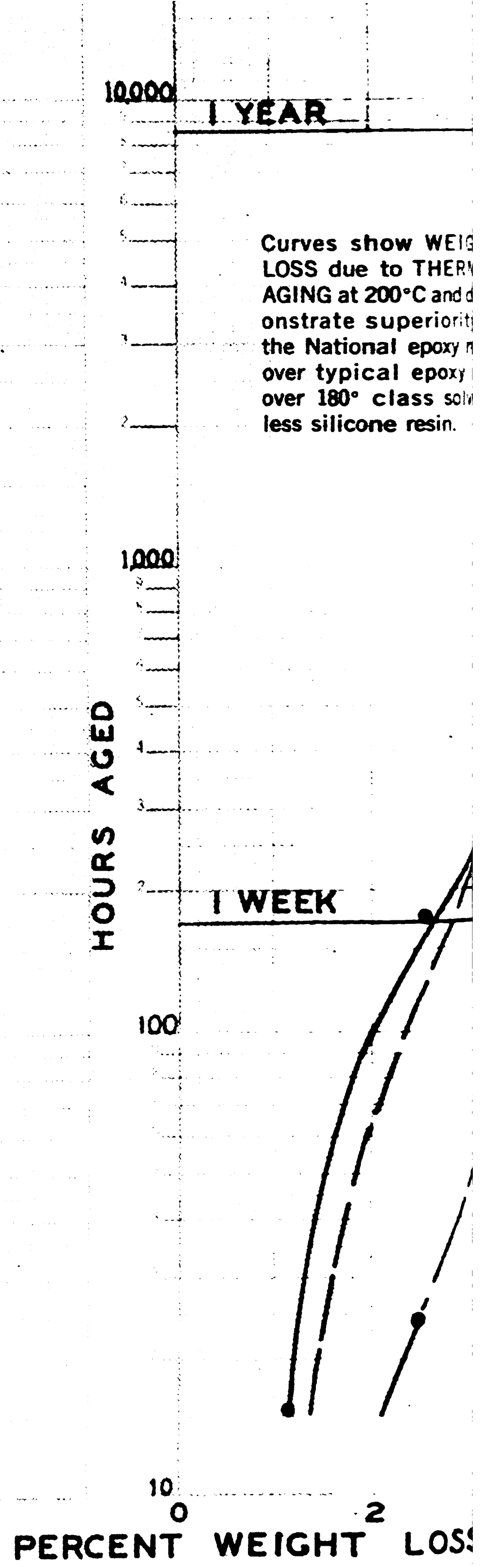


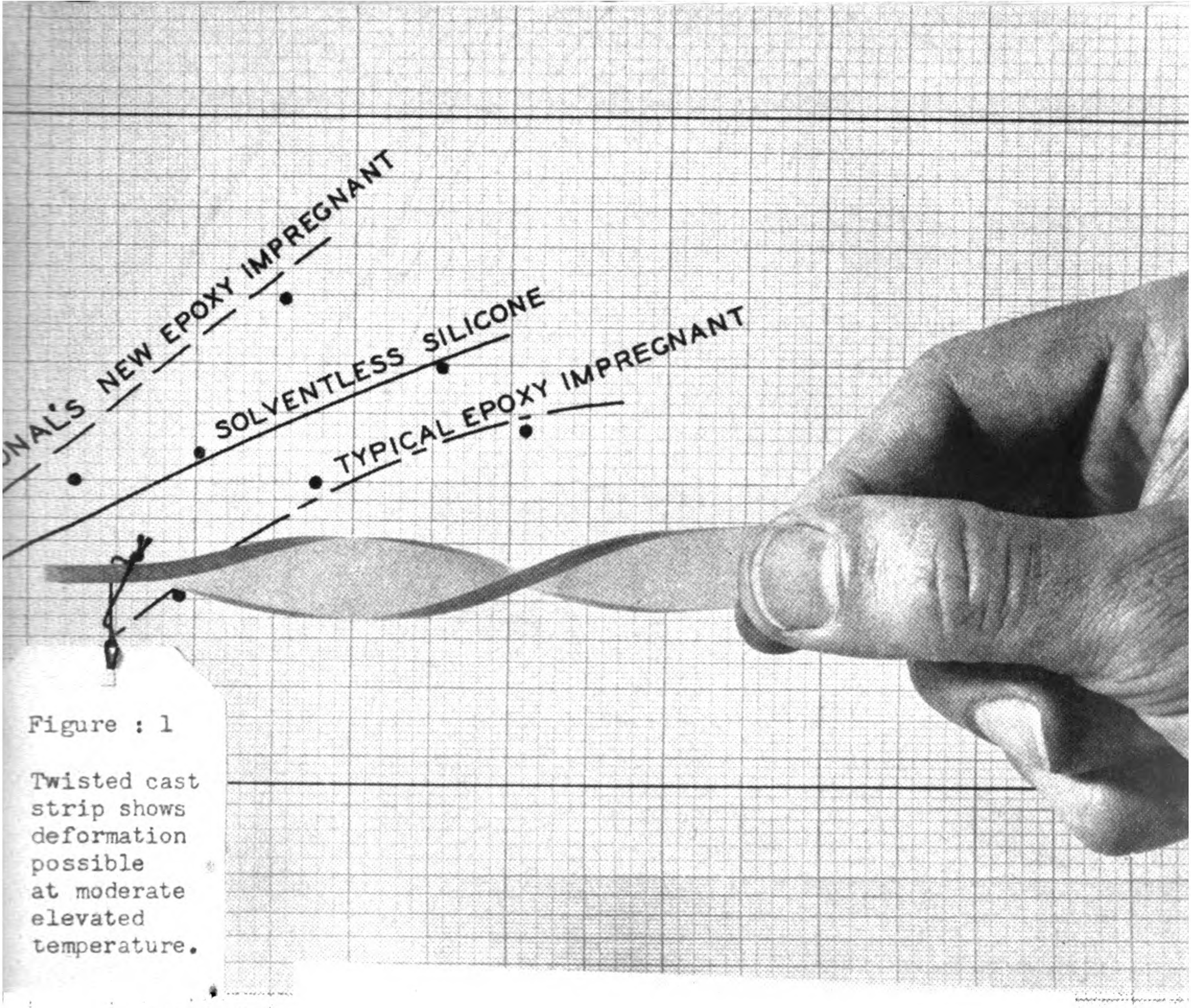
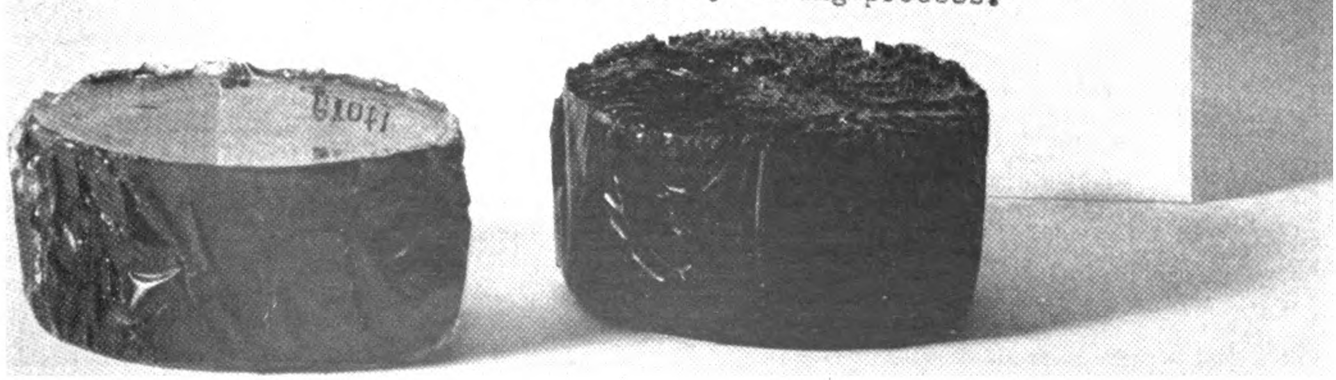


Figure : 1

Twisted cast strip shows deformation possible at moderate elevated temperature.

Figure : 2

Both of these 2-ounce samples were cured in a 300 F oven. The new National epoxy at left stayed clear and shows no effects of exothermic temperature rise. Sample at right turned dark, and is crazed and cracked. This illustrates destructive effects of high internal temperature generated by curing process.



Report

(Continued from page 5)

for model changes; third, railroads are anticipating heavy grain shipments; fourth, railroad profits increased last year; fifth, government climate is getting progressively better; and, last, it is historically true that when carloadings increase, railroads buy.

June 1963 orders for new freight cars totaled 2,349 compared with 3,411 in June last year. Backlog of cars on order and undelivered as of July 1, 1963, showed 8,726 in railroad shops and 13,233 in shops of contract carbuilders — a total of 21,959. This compares with 13,274 on order July 1, 1962.

Mechanical Division Seeks Improved Journal Performance

In the face of a leveling off in freight-car journal performance and confronted with an increasing proportion of aging lubricators in solid-bearing journal boxes, the AAR Mechanical Division has recently taken several steps to make possible a resumption in the upward trend in mileage per hotbox set off. Four months in 1962 saw the entire car fleet operate with over one million miles per hotbox set off—the first time the million-mile figure had ever been achieved in over 12 years of AAR hotbox record keeping.

After million-mile performance in each of the last three months of 1962 (RL&C, May, p 46), the first months of 1963 showed the following: January—954,270 miles; February—939,005 miles; March—1,074,730 miles; April—1,135,927. These were 107,000 to 225,000 miles higher than corresponding 1962 months.

Even as this April figure became known, the Mechanical Division was already at work on the lubricator problem. The AAR Research Center in Chicago has designed what is planned to be a standard lubricating device. This lubricator will be submitted to the regular laboratory and road tests required by AAR specifications before it can be offered as a candidate for what is the goal of several AAR member roads—one universal type of pad to take the place of the 27 different models currently making up the Mechanical Division's "conditionally approved" and "approved for test" lists. The legal complications of supplanting these proprietary devices are unresolved but currently under study.

While a standard lubricating device might be some years away, the Division is currently acting to assure that the varied designs now in service will continue to perform as well as they have been doing.

It has been found that some railroads have neoprene cores used in new lubricators supplied them and have been installing such cores in lubricators undergoing renovation, although this material is not standard. The Mechanical Division has warned that pads have AAR sanction only in the form originally submitted for laboratory and road test. The practice of substituting neoprene cores for the nitrile or urethane cores originally standard cannot be done indiscriminately. Recognizing the apparent superiority of neoprene, steps have been taken to facilitate its use in place of materials which have sometimes performed poorly.

Manufacturers have also been asking for permission to furnish their lubricators with more than one kind of core material. It was agreed by the Committee on Lubrication of Cars and Locomotives that, when manufacturers of lubricating pads, which have "Approved for Test" or "Conditional Approval" status, desire to change the core material from nitrile or urethane to neoprene, they may request the AAR Research Center to conduct tests at the manufacturer's expense to determine whether such substitution will be satisfactory. These tests will include wicking test on complete lubricator, saturation test on complete lubricator, pilot machine test at 40 and 100 mph at 130 deg ambient temperature on complete lubricator, tensile test on neoprene core material only, and such additional tests as AAR laboratory personnel may deem necessary.

If the lubricator with the neoprene material passes all these tests, the manufacturer may use neoprene as a substitute. Already seven of the 24 devices on AAR lists are approved with the two types of cores.

The railroads and private car owners have been requested not to order and use those lubricators having unauthorized core materials and manufacturers have been requested not to furnish them.

In renovation, Specification M-910[illegible] —Renovated Journal Lubricating De[illegible] Procedure, has been modified to requ[illegible] that "Replacement cores must be ob[illegible] from the manufacturer of the lubricator [illegible] his source of supply. Core must meet [illegible] specifications and requirements for type [illegible] core or cores having AAR approval for [illegible] lubricator involved."

Nitrile has been used in lubricators [illegible] cause it retains its resiliency at low te[illegible]peratures. However, it apparently hard[illegible] with age, the reason for the railroads' de[illegible] to substitute neoprene. Manufacturers ha[illegible] recently indicated that it is possible to [illegible]part better low-temperature character[illegible] to neoprene.

Renovation of lubricators could [illegible] stopped entirely if the Lubrication Co[illegible]mittee does find that lubricators clea[illegible] after 30 months' service and reused are [illegible] primary cause of hotboxes. Preliminary [illegible]dications, the Committee says, are that re[illegible]vated lubricators have been a major f[illegible] in the drop-off in journal performance[illegible]

Next step would be to determine if [illegible] can operate 36 months. If they can, to[illegible] low lubricator cost justifies mand[illegible] scrapping rather than any attempt at [illegible]

(Turn to page 53)

Orders and Inquiries for New Equipment

Placed Since Closing of July Issue

Locomotive Orders

CANADIAN PACIFIC.—*General Motors Diesel, Ltd.:* 12 2,500-hp diesel-electric locomotives for freight service. For early 1964 delivery.

LONG ISLAND.—*Alco:* 21 2,000-hp Century 420 units. Cost, $3.8 million. Delivery to begin this year and be completed by mid-1964.

Passenger Car Orders

NEW YORK CITY TRANSIT AUTHORITY.—*Budd:* 600 stainless-steel subway cars. Unit price, $114,700. Ten cars to be put in service about July 1, 1964, with deliveries of remaining cars continuing at a rate of 40 a month.

Freight Car Orders

CANADIAN NATIONAL.—*Marine Industries:* 100 88-ton, 3,000-cu ft aluminum tank-type covered hopper cars.

CANADIAN PACIFIC.—*National Steel Car:* 150 88-ton, 3,000-cu ft aluminum tank type covered hopper cars. *Marine Industries:* 100 88-ton, 3,000-cu ft aluminum tank-type covered hopper cars. Cost of 250 cars, first all-aluminum models ordered by CP, primarily for potash traffic, $4.5 million. Cars will also handle other dry bulk commodities such as sugar and cement. Deliveries to begin in November.

CHICAGO & NORTH WESTERN.—*Thrall Car:* 100 60-ft 9-in., 100-ton box cars with 16-ft doors and cushion underframes. For October delivery.

DENVER & RIO GRANDE WESTERN.—*Bethlehem Steel:* 60 89-ft, 70-ton flat cars with roller bearings—11 equipped with bi-level auto racks; 49 with tri-level racks.

GRAND TRUNK WESTERN.—*Pullman-Standard:* 121 steel-sheathed box cars. *Greenville Steel Car:* 100 70-ton, 56-ft flat cars.

ILLINOIS CENTRAL.—*Company shops:* 25 60-ft, 70-ton flat cars with cast-steel underframes. Unit cost, $13,800. Work to begin in November or December and completed in 30 days.

NORFOLK & WESTERN.—*Greenville Steel Car:* 60 cushion underframe 100-ton roller-bearing box cars, 60¾ ft long and 15 1/3 ft high, with double doors higher and wider than usual. Delivery of cars, to be used for transporting auto engines and transmissions, to begin in November. Cost, $1,460,000.

NORTHERN PACIFIC.—*Company shops:* 100 70-ton RBL type bunkerless insulated box cars equipped with roller bearings—30 equipped [illegible] load dividers; 70 with damage-free devices[illegible] livery to begin in February.

PENNSYLVANIA.—*Company shops:* 5 55-[illegible] pressed-center flat cars for transporting [illegible] machinery, boilers and large units of elect[illegible] equipment. Capacity, 45 tons. Cost, $12[illegible] For October delivery.

ROCK ISLAND.—*ACF:* 25 89-ft flat cars for [illegible]mobile service. Cost, $500,000. To be equi[illegible] with tri-level racks by Whitehead & Kales. [illegible]livery to begin about mid-August.

SOUTHERN.—*Pullman-Standard:* 400 60-ft [illegible] 100-ton Super-Cushion box cars with damage-f[illegible] loading devices. Cost, $9.6 million. Delivery [illegible] begin in September.

Notes and Inquiries

Frisco will construct car repair facilities, [illegible]cluding car shed, engine service facilities and [illegible]ditional yard tracks, at Ft. Smith yard at a [illegible] of $299,984.

Louisville & Nashville will acquire 130 ad[illegible]tional 89-ft tri-level rack cars for handling au[illegible]mobiles—80 to replace a similar number of [illegible] and 87-ft tri-levels now in use. Tri-level racks [illegible] shorter cars will be lengthened and installed [illegible] Dana. Fifty new racks will be purchased. Cost [illegible] new equipment and modifications will be $710,[illegible]

MAN and *Farbenfabriken Bayer*, Germany, ha[illegible] developed a design for a plastic train and is ex[illegible]perimenting with plastic doors and roofs [illegible] freight cars and tanks for locomotives.

Norfolk & Western plans to purchase, at a co[illegible] of more than $3 million, 15 general purpose die[illegible] electric locomotives in 2,300 to 2,500 hp rang[illegible] Bids expected in near future from several ma[illegible]facturers.

Westinghouse Electric will build in Pittsbur[illegible] Pa., a mile-long "Skybus" project involving [illegible] use of lightweight, electrically driven 20-passeng[illegible] vehicles operating singly or in trains [illegible] grooved, elevated concrete roadway. Cars in th[illegible] three-car train will be rubber-tired and will b[illegible] operated automatically. The system will be bu[illegible] in South Park, a recreation area which, the Po[illegible] Authority explained, provides cost-free space f[illegible] the experiment and a built-in riding group dur[illegible] all seasons of the year. It also offers later oppo[illegible]tunities for more extensive tests of the syst[illegible] and for possible incorporation of the test secti[illegible] into a mass transportation system for the Pitt[illegible]burgh area. The project will cost $3,170,000. Co[illegible]struction is expected to begin around Labor Da[illegible]

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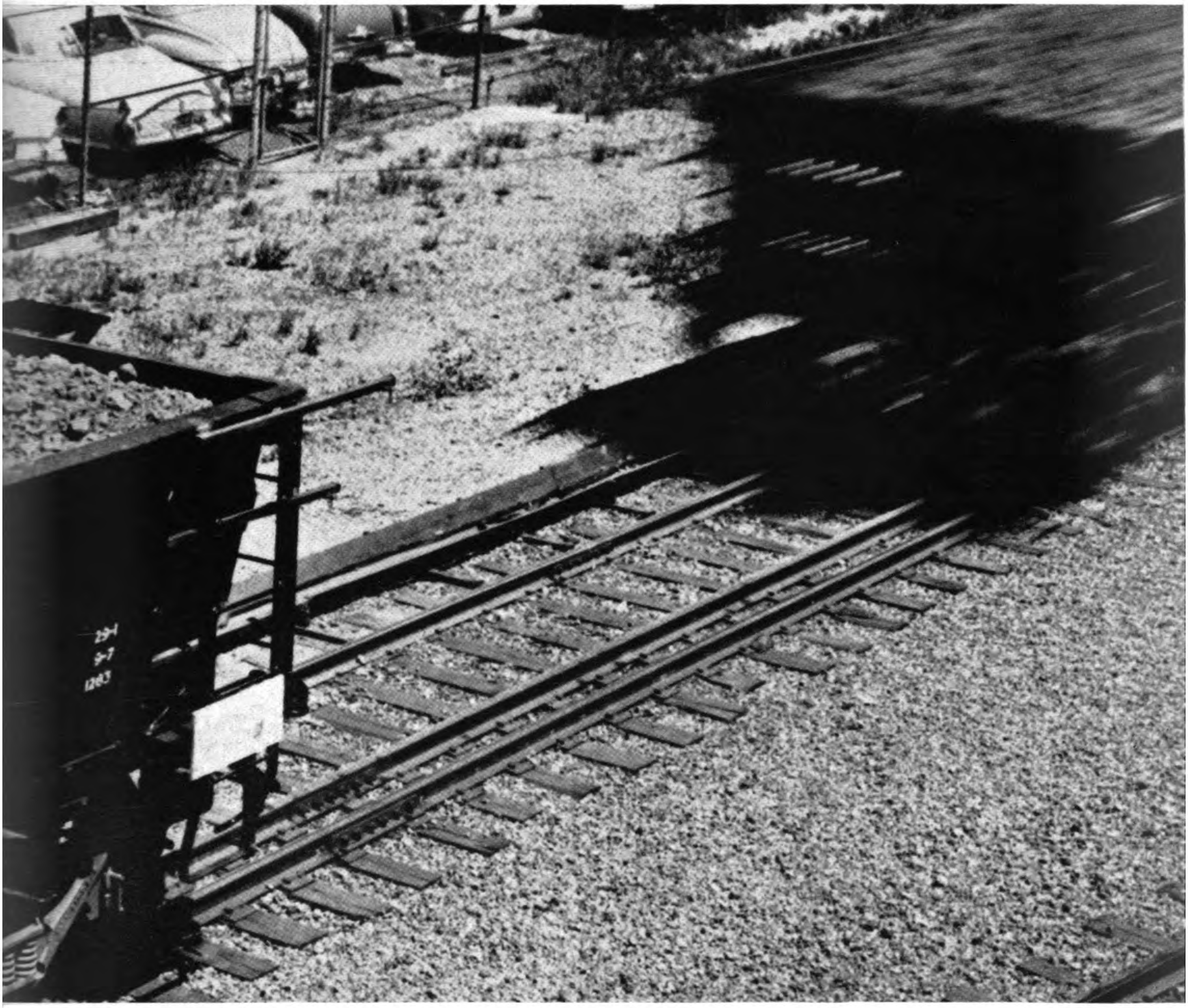
'IONAL RUBBER DRAFT GEARS HAVE RESERVE CUSHIONING CAPACITY... NEVER GO SOLID



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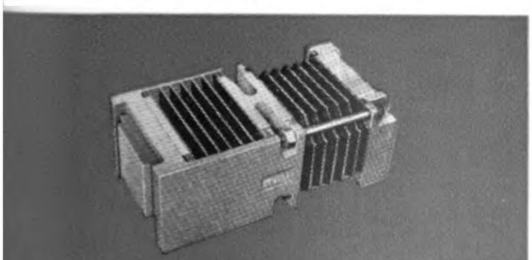
IATIONAL RUBBER DRAFT GEARS

ional Rubber Draft Gears cushion all the way... all the time... never 'solid". Center sill stresses are reduced up to 59 percent... coupler es to 33 percent (compared to a conventional AAR approved friction r)... brings the stresses down into the safe capacity for which the structure was designed.

he National MF-400A, unconditionally certified for interchange service, an official* rated capacity of 30,640 foot-pounds at 504,400 pounds force and 2.54 inches travel... however... the MF-400A with its reserve cushioning capacity boasts a maximum capacity of 72,500 foot-pounds at 1,237,000 pounds force and 3⅜ inch travel.

Get Extra Value in Extra Car Protection with Reserve Cushioning Capacity! Specify National MF-400A Rubber Draft Gears, particularly for bulk loading cars.

A-8824A



MF-400A... Unconditional Certificate No. 39...
*AAR Specifications M-901D-59.

Transportation Products Division
Cleveland 6, Ohio

International Division
Cleveland 6, Ohio

National Castings Company of Canada, Ltd.
66 Portland St., Toronto 2B, Ontario

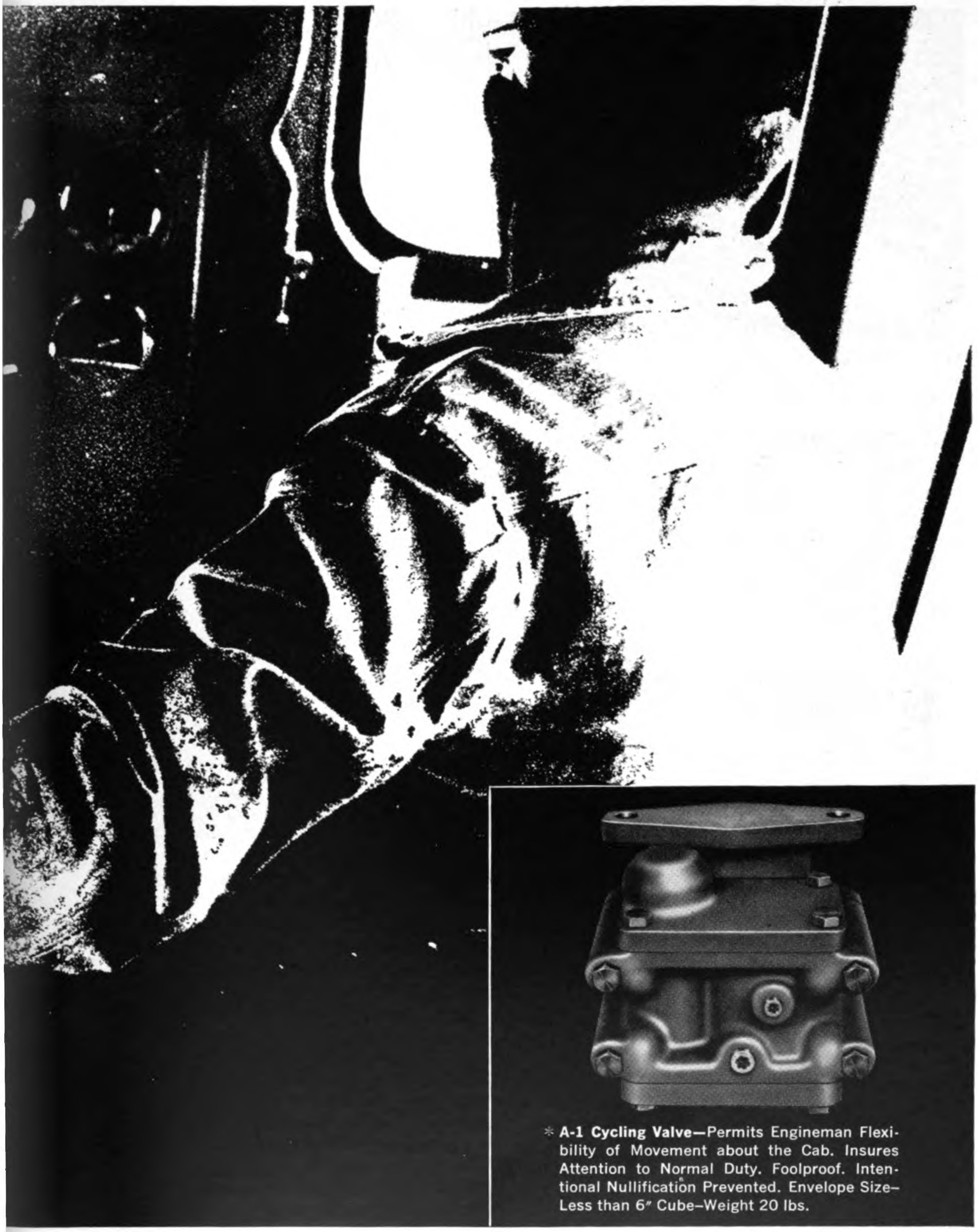
GEARED TO PROGRESS P R I MEMBER

NATIONAL CASTINGS COMPANY

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES • ROLLER BEARING ADAPTERS • NATIONAL SPEEDLOADER CONTAINER HANDLING SYSTEM

WABCO SAFETY INSURING SYSTEM GUARANTEES INFALLIBILITY OF CONTROL OF MOVING TRAINS

12



* A-1 Cycling Valve—Permits Engineman Flexibility of Movement about the Cab. Insures Attention to Normal Duty. Foolproof. Intentional Nullification Prevented. Envelope Size—Less than 6″ Cube–Weight 20 lbs.

NDABLE – Over 40 years of proven service with system. Continuously monitors the engineman gh a foot pedal interlocked with the air brake m. Brakes are applied and power shut off should ngineman cease his normal functions.

FEATURE ADDED* – Cycling Valve gives engine-freedom of movement. Prompts attentiveness to al duty. Departure from normal requires acknowl-ient to forestall full automatic brake application.

EASILY INSTALLED – Entirely pneumatic. Requires no mechanical or electrical drive. Small pipe connections. Maintained by air brake personnel.
Tamperproof – lowest cost.
Your Westinghouse Air Brake Division representative will be pleased to review this system with you.

WABCO **WESTINGHOUSE AIR BRAKE DIVISION**
WILMERDING, PA. / Westinghouse Air Brake Company

Dragging/Dynamic Braking of 140 loaded coal hoppers over the Appalachians gives diesels a real test!

N&W traction motors and main generators do the job with NATIONAL Brushes

TRADE MARK

The Norfolk & Western is the nation's largest originator and carrier of bituminous coal. The "Going-est Railroad" moves one out of every seven tons mined.

Hauling more-than-a-mile-long trains of loaded 85-ton coal hoppers through the mountainous regions of Virginia and West Virginia is a tough workout for diesel equipment. Such an operation involves *severe cycling*—ranging from full throttle to full dynamic braking. For assurance of stand-out brush performance with dependable commutation and minimum commutator maintenance on these winding, up-and-down runs—and elsewhere on the system—the N&W relies on NATIONAL brushes.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.

Contact Mr. National Carbon

UNION CARBIDE

"National" and "Union Carbide" are registered trade-marks for products of

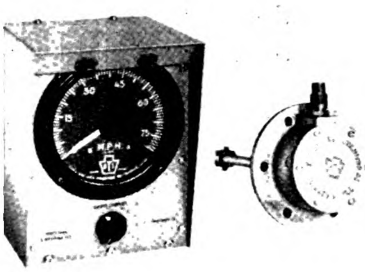
NATIONAL CARBON COMPANY

What's New in Equipment

avity Gate

a ash, potash and clay are said to have
ı unloaded up to three times as fast as
nerly with the quick-dumping outlet
del G-4500 dry bulk car gravity gate.
gate, with its 6-ft square opening, is
able for any commodity where the dis-
rge rate need not be controlled. It can-
be opened accidentally. With gate open,
dbed clearance is 5⅝ in. The unit,
eloped for the Shippers' Car Line divi-
ı, may be applied to all new ACF Center
w cars and some models already in
ice. ACF Industries.

*'or more information, circle 8-1 on card
owing page 56.*



eedometer

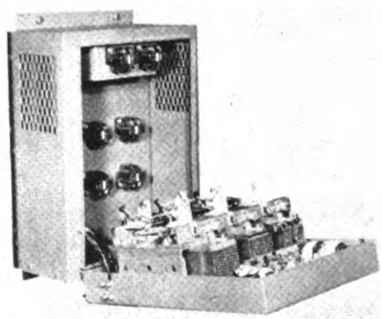
ctrically operated diesel locomotive
edometers SI-75 (freight) and SI-120
ssenger) measure mph by a magnetic
ximity pulse network which depends on
plitude, not frequency. Models, designed
speeds of 80 and 120 mph respectively,
sist of an axle generator and cab indi-
r unit. There are no brushes or rotating
ds. Moving parts consist of a shaft
ating on two roller bearings in axle
erator. Tools, Dies & Stamping Co.

*'or more information, circle 8-2 on card
owing page 56.*

Solvent Cleaner

Torbax is a cold soak solvent cleaner for small parts recommended by the manufacturer for the removal of oils, sludge, and carbon smuts from diesel-engine parts, roller bearings, and injector parts. It is recommended also for diesel-engine block cleaning because it will not damage crankcase sealer paint. The cleaner can be diluted with petroleum solvents or water and used at room temperature. It contains no phenols, cresols or chlorinated solvents. Wyandotte Chemicals Corp.

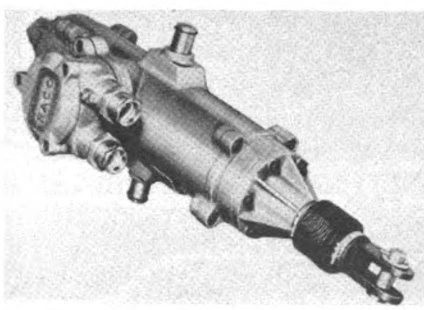
For more information, circle 8-3 on card following page 56.



Static Contactor

Initial installations of Trinistrol contactors are said to have recorded over 8,000,000 operations and 22,000 hr of uninterrupted maintenance-free service. The contactor line, which features Trinistor controlled rectifiers which block voltage in the forward as well as reverse direction, is rated at 7.5 to 100 hp and can be used with 220-, 230-, 440-, or 460-volt, three-phase, 60-cycle service. Westinghouse Electric Corp.

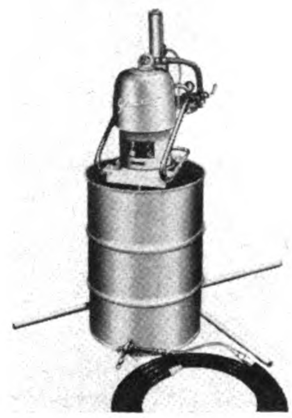
For more information, circle 8-4 on card following page 56.



Electric Cylinder

The Raco electric cylinder, an all-electric actuator, is a substitute for air and low-pressure hydraulic systems. It is available in standard units from 110 to 6,600 lb of thrust and for special applications as high as 8,500 lb of thrust, and can be had for trunnion, foot or end mounting. Motors are wound for 220-, 440-, or 550-volt, 3-phase, 60-cycle current with standard insulation for general industrial use, or wound with Class H insulation for high-temperature applications. Strokes range from 2 to 47 in. in speeds from 2.3 to 11.3 in. per sec. Thrust and speed are the same in the push or pull direction, and stroke can be controlled for intermediate positioning. Raco Machine Co.

For more information, circle 8-5 on card following page 56.



Inductor Spray Unit

The 30:1 ratio pump of the Bulldog Hydra-Mastic inductor delivers up to 3 gpm of plastisols, asphalt and petroleum base coatings, sound deadeners, sealers, and other protective coatings. There being no atomizing air hose, overspray is practically eliminated. The equipment includes an air-powered elevator for easy drum changing, 25 ft of delivery hose, and a special spray gun. The Reverse-A-Clean nozzle with its reversible ball tip enables the removal of spray gun obstructions without dismantling the gun. Gray Co.

For more information, circle 8-6 on card following page 56.

Turbocharger Tester

The portable TC-120 set powered by radio batteries is designed to test a turbocharger while operating on a diesel engine. It measures rpm, air and turbine inlet temperatures, exhaust back pressure, compressor inlet vacuum, manifold, oil and barometric pressures. The 18 x 13 x 6½-in. kit weighs 23 lb. A 2,500- to 7,000-ft altitude compensator is available. Accessories include a tachometer pickup probe and generator disc. Meter-Makers, Inc.

For more information, circle 8-7 on card following page 56.

Oil Purifier

The need for engine oil changes is said to be reduced with the Bergstrom oil purifier which uses centrifugal force to separate

(Continued on page 20)

N-S-F® GIVES YOU A NEW FLOOR THAT'S A

At Chicago & North Western Railway, N-S-F installation time is only 28 man hours per floor.

One thing you can say a wornout floors: They we made with N-S-F.

N-S-F is National Steel's able Steel Flooring, the that stands up *years lo* than the others.

Replacing with N-S-F gives a better floor in every With its patented design ting strength where it's need N-S-F takes all types of la with ease, all kinds of pun ment without buckling. durable, sturdy flooring th go years without needing pairs. Made of rugged GL steel and welded directly the underframe, N-S-F a strength to the entire c especially in the bolster a

NATIONAL STEEL CORPORATION

UGH AS THE OLD ONE SHOULD HAVE BEEN

' day, as original or re-
ment flooring, N-S-F is
g for itself many times
for all major railroads.
so dependable, in fact,
we guarantee it in writing.
more information, write
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portation Products Division,
V. Monroe St., Chicago 3,
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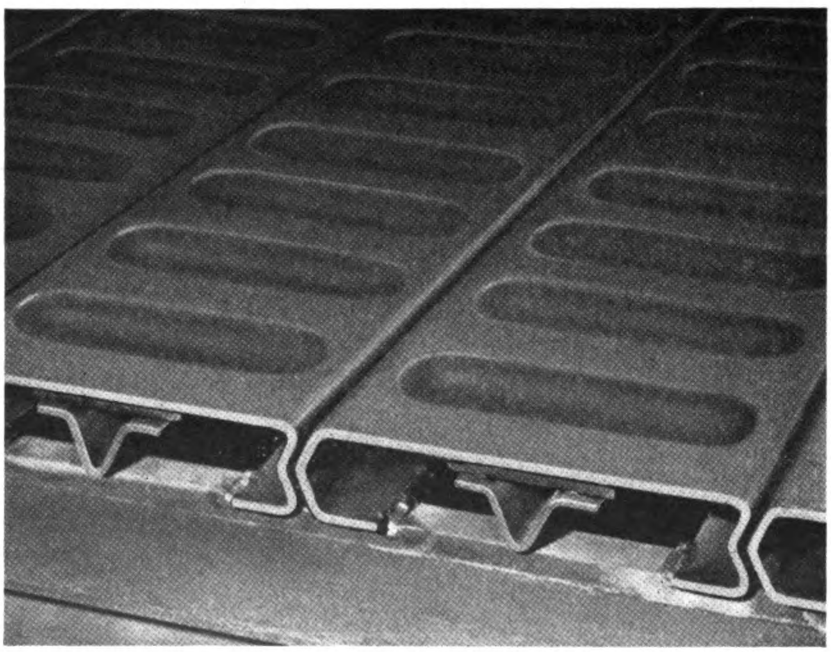
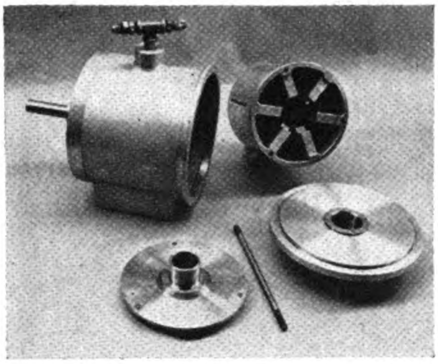
Montgomery St., San Francisco
lif.; 613 15th St. N. W., Wash-
n 5, D. C. In Canada: 6205
De Liesse Road, Montreal 9,
ec, Canada.**

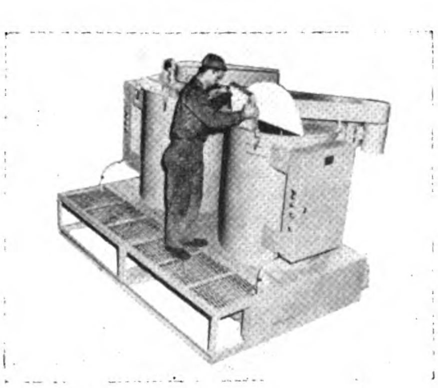


Patented N-S-F design provides high strength. Many types available to meet varied load requirements.



materials of different densities. Contaminated oil passes into the center of the purifier; sludge, carbon, and particulate matter are whirled to the built-in sludge traps on the inner surface of the rotating element. Purified oil then flows freely through an opening at the bottom of the housing back to the engine. The two-piece configuration has only one moving part. It is basically an engine-driven rotating element which revolves within a metal housing. Only 10 min, it is said, are required to remove the rear cover, withdraw the rotor, clean the sludge traps, and reinsert for another 100 engine hours of service. No screens or filters are involved. The unit, which is an integral part of the engine, it is said, has been installed by U.S. and Canadian railroads. Bergstrom Engineering Co.

For more information, circle 8-8 on card following page 56.



Air Filter Washer

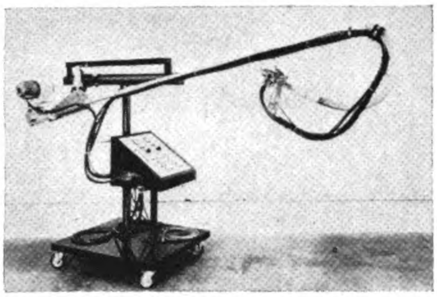
The Cyclone 36, based on the centrifugal principle, is said to assure positive and thorough cleaning, drying, and oiling of all permanent type air filters, particularly diesel-engine filters. It has a production capacity of 48 20- x 27- x 2-in., or 24 20- x 27- x 4-in. filters per hour. It is built of heavy steel plate, electrically welded throughout, and runs a 6-min. cycle with cycles 10 per hour. Ramco Equipment Co.

For more information, circle 8-9 on card following page 56.

Lubricant

HTG is a formulation of clear oils, solvents and cleaners which acts as an anti-oxident, preventing rust and corrosion when added to other lubricants. It is said to loosen frozen connections, soften carbon deposits, eliminate and prevent the formation of sludge, and completely clean internal combustion engines. It is used full strength only when used as a penetrating oil and as a cleansing agent. HTG Oil Co.

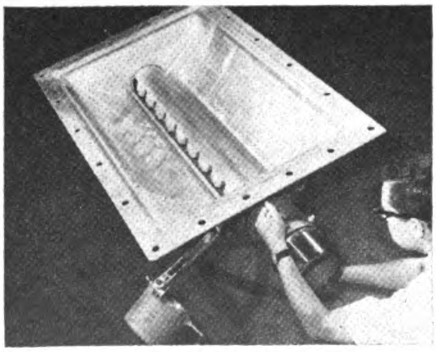
For more information, circle 8-10 on card following page 56.



Spray Applicator

The portable fiber-glass spray applicator employs the concept of external blending of chopped glass rovings and resins. The adjustable applicator nozzle, which can be anchored to any of several two-component catalyst type guns, produces either a round or adjustable fan pattern. The gun is attached to a tubular boom by a short length of flexible tubing. The boom is mounted on a retractable carriage that, in turn, is pivotally mounted to swivel both horizontally and vertically. Chopper motor air pressure at 45 lb produces at least 3 lb per min of chopped fiber with the motor consuming approximately 9 cfm of air. The upper limit of fiber production is 6 lb per min. Blades can be arranged in the cutter body to vary fiber length from ⅜ to 2 in. DeVilbiss Co.

For more information, circle 8-11 on card following page 56.



Pneumatic Outlet

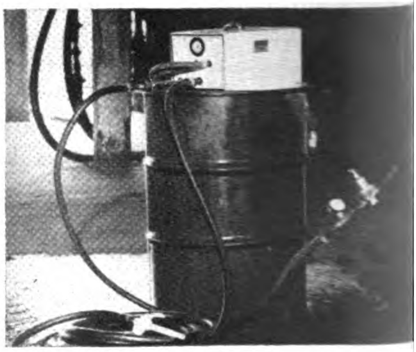
Soda ash, potash, and free-flowing materials — plastic pellets and powders, grain, and rice—may be unloaded at their optimum discharge rate through Pneumatic Outlet Model P-4350. The outlet, which can be quickly disassembled, may be operated from either side of a Center Flow car and used with any type or size pneumatic system that provides a vacuum to the outlet nozzle. The outlet consists of a rotating valve mounted in a shallow aluminum hopper, and a handle which controls lad- flow. Inspection and cleaning is done w- out entering the car. ACF Industries

For more information, circle 8-1- card following page 56.

Rivet Gun

Slippage on smooth stem blind rive- said to be eliminated with the Bulldog which features rear stem ejection. gun, weighing 3 lb complete with pull head, operates on 90 psi air pressure pulls all hollow style Cherry commer rivets from $\frac{3}{32}$ in. through $\frac{3}{16}$-in diame in aluminum, steel or monel, and thro $\frac{1}{8}$-in. diameter plugged rivets. Full $\frac{1}{8}$-in. stroke allows installation of at 50 rivets per minute. Three pulling h- cover entire range of rivets. Offset pull heads for corner and minimum cleara- applications are available. Townsend C

For more information, circle 8-13 card following page 56.

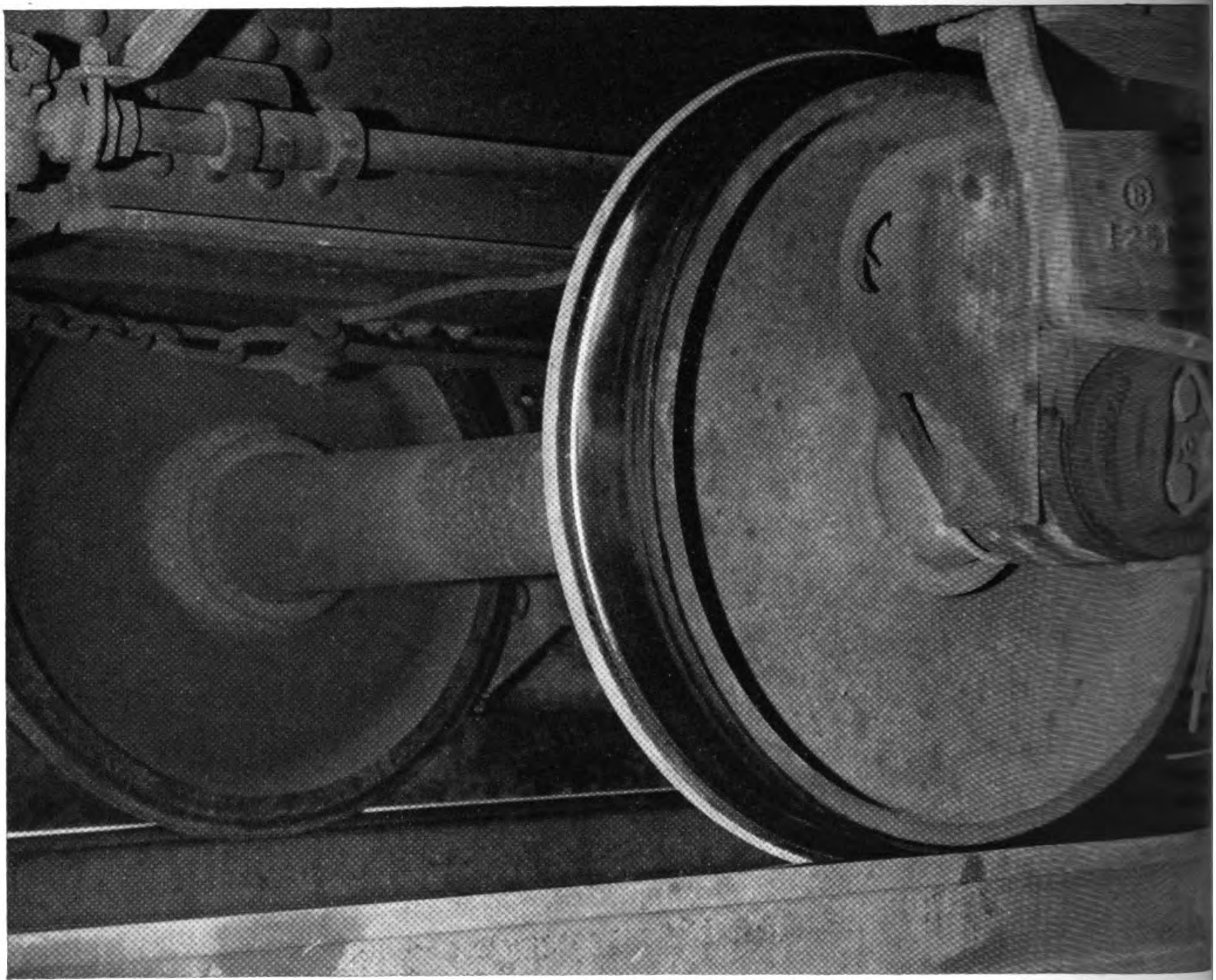


Foam Washing

The portable Foamizer pumps Oakite solution to itself from any container, mix- it with air, and generates foam withou- pause. The unit can be placed above 55-gal drum, a series of connected drum- or a tank of any size. It includes an elec- motor, vane type pump with replace- impeller, 50 ft of discharge hose, gun sh- off valve, and air-pressure regulator weighs 30 lb without hose and operate- 110-volt a-c. The 74-L liquid detergent be used to clean transportation equipme- both outside and inside. It can be app- by brush or mop as well as spray eq- ment. Oakite Products, Inc.

For more information, circle 8-14 card following page 56.

On the C&O . . .
the Revolutionary GP-30



Proved Performance Makes Wrought Steel Wheels YOUR BEST BUY

Before placing your next order for wheels, ask us about the unsurpassed performance record of Armco Wrought Steel Wheels. It dates back more than 30 years—covers all kinds of operating conditions—includes heavy diesel and fast passenger car service. Armco Wrought Steel Wheels have already been proved in fast, heavy service.

Armco Wrought Steel Wheels have toughness forged and rolled right into them. The cast structure of the ingot is refined and kneaded into a dense, strong mass. Carefully controlled cooling guards against internal defects.

You can be sure that Armco Wrought Steel Wheels will stand up in the fastest and toughest freight service . . . provide maximum durability and dependability. For complete information, call your nearby Armco Sales Office or write **Armco Division, Armco Steel Corporation, Dept. A-2023, P. O. Box 600, Middletown, Ohio.**

ARMCO **Armco Division**

Editorials

ǀectrical Insulation Testing

ıe railroads were among the first users of electrical uipment to make extensive use of direct-current, high-tential electrical testing. The procedure is particularly :ll adapted to railroad requirements since insulation on :omotive and car equipment is subject to the effects of ıter, oil and vibration with actual insulation values varyg through a wide range while the equipment still remains ı an operable condition. With a little experience, d-c ıting can be used to indicate insulation condition without ısing it to break down.

There is still much controversy concerning the relative ıvantage of alternating- vs direct-current testing. Relaıe advantages were compared in the light of recent exrience in a recent IEEE paper by H. N. Miller of Assoıted Research, Inc.

Concerning a-c testing, Mr. Miller says, "The a-c poıtial test is primarily a go or no-go test. The voltage is sed to a specific level, and if the equipment breaks wn or shows signs of excessive leakage current, the item der test has failed. If the circuit breaker does not opıte or the leakage indicator does not light, the item has ssed." How close the equipment came to failure or by ıat margin it passed is not known. The test only indites good or bad.

A d-c high-potential test, Mr. Miller says, "can do more than give a good or bad indication. It can indicate pretty good, or almost too bad. It frequently can indicate all right for now, but expect a failure soon." If properly heeded, such indications will fit in well with a lot of things that railroad operators need to know.

A-c high-potential tests, Mr. Miller says, find the widest application for go or no-go testing of small, low-capacitance equipment, as for production testing of consumer items and materials tests. D-c high-potential tests are generally employed where quantitative rather than qualitative results are necessary in evaluating the relative condition of insulation. A d-c potential test usually takes longer to perform than an a-c test because of the charging and discharging time required. The d-c test is also potentially more dangerous because of the possibility of voltage build-up (after the power is shut off) caused by absorption effects.

A d-c high-potential test set may be much smaller in size and cost than the equivalent a-c unit required for testing large or highly capacitative items. Most existing specifications call for a-c high-potential tests. In many cases this is because of the lack of general familiarity with the newer d-c test techniques, and availability of equipment, rather than because the a-c test per se is better.

While there is no general agreement on a-c to d-c conversion factors, consumer equipment manufacturers tend to use the figure 1.7 for production testing, aerospace industry manufacturers lean toward the figure of 2, while wire and cable manufacturers use a figure of 2 to 3 or even higher. Various public utilities use figures of 2 to 5 in testing large rotating machinery.

ıssess Complications Involved

:I—Automatic Car Identification—under consideraın and test by several individual railroads, is also being ıdied by railroad groups, including the Association of nerican Railroads. Various systems have been prosed to make it possible for wayside sensing equipment determine automatically the owners and numbers of :ight cars passing at speed and to record this informaın. ACI could eliminate much of the car checking now ne in yards and might eventually have other uses of en greater significance in the operating realm.

The Railway Action Group, an informal organization railroad research men, some time ago sought to spark : development of an acceptable system by issuing a rformance specification which indicated the range of sts which would be acceptable for the components inlved (RL&C, March 1962, p 5). The AAR Research :partment has made ACI the subject of a formal investition (RL&C, May 1963, p 20). RAG specification ought forth a couple of dozen proposals—some from ditional railroad suppliers and other from organizans with no previous railway industry experience.

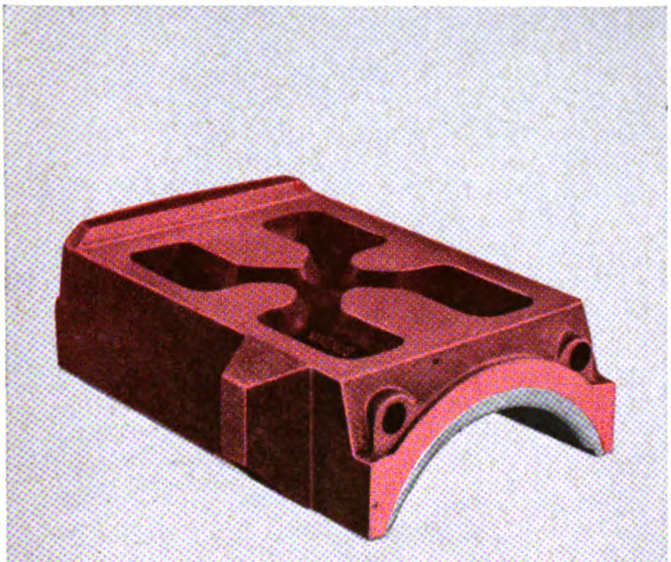
Proposed systems would variously bounce microwave, ht or other radiation off a specific area of each car, ıking it possible for the car to carry an inexpensive, in- reflecting placard or device arranged to return a dis:et signal positively identifying the car. The car side, : side sill, the underframe, the truck side frame, the journal box and the axle have all been proposed as locations for the identification system. Identifying legends proposed include reflecting bands of various materials, widths, arrangements and colors; plates which have been embossed, punched, or notched; and tuned coils.

Mechanical officers would be well advised to keep abreast of ACI. The area of the car finally chosen and the type of identifying system could affect car design and maintenance. Devices which might be rendered "unreadable" when covered with snow, brake-shoe dust or road dirt could make necessary the installation of a multitude of wayside cleaning systems or the shopping of cars for "ACI cleaning." The ACI reflectors should be durable—having the ability to withstand weathering, sandblasting, fire and corrosive chemicals. Any system which is finally chosen should also have a reflecting device which can not only be easily read by a layman, but can also be reproduced in any car shop. Derailment, car thawing and corrosive landings all could damage reflectors so they would have to be reproduced on short notice with simple tools.

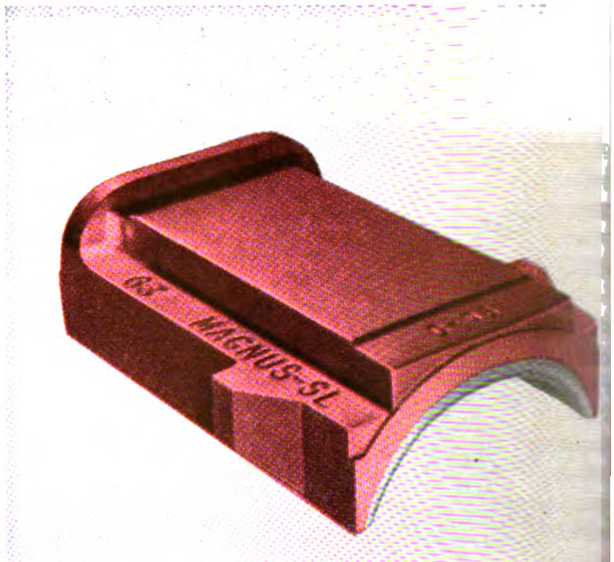
Benefits for the railway industry accruing from ACI can be greatly enhanced if a system incorporating maximum durability and minimum maintenance is adopted. Mechanical officers have a duty not only to themselves, but to their managements, to become acquainted with the various ACI systems and to make themselves heard on the ACI reflectors which may be applied to freight cars. ACI, for the mechanical man, should not mean only "Automatic Car Identification," but also "Assess Complications Involved."

These Magnus Bearings can Stabilize Journals

Give you still longer car bearing life, may double bearing performance you're getting now.



FLAT-BACK BEARINGS
(AAR Alternate Standard)



NEW HI-HAT BEARINGS
(AAR Test-Approved)

Magnus Flat-Backs stay seated on the journals, eliminate excessive fore-and-aft movement under all normal operating conditions. That means full fluid oil film lubrication, maximum bearing performance all the time. Rear seals and bearings last longer. 2,000,000 car miles per hot box is a realistic goal for Flat-Backs.

Developed by AAR research, 10,000 carsets of Hi-Hat bearings are now authorized for interchange. They stabilize journals too. Wider wedge-journal box column contact area lets wedge take brunt of impact forces. And Hi-Hats are lighter—can save real money if current operating tests prove satisfactory.

For helpful, detailed information, write Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

MAGNUS
METAL CORPORATION
Subsidiary of
NATIONAL LEAD COMPANY

\CF Car Handles Bulky Auto Parts

High cube, high capacity and smooth interiors are featured in experimental 85-ft car and in 60-ft models now being built

\n 85-ft experimental box car, lt by ACF for movements of auto-bile parts, has begun runs between 'd fabricating and assembly plants. s is one of two standardized types :ars which many in the automobile ustry now see as being capable of ving the diversity of components ich go into today's automobiles L&C, July 1963, p 34).

Three railroads—the Louisville & shville, Wabash, and Southern Pa-c—have cooperated with ACF and 'd in the development of the 10,-)-cu ft, 85-ft car. This high-cube ign for handling low-density parts, marily stampings, will soon be ied by a series of 60-ft box cars ich are to handle higher density omobile parts such as castings and gings. All the cars, both 60- and ·ft, are to be equipped with cushion lerframes.

While the 85-ft design is scheduled be operated for several months so t Ford and the railroads can evalu-its performance, the 60-ft versions already, or soon are to be, in pro-:tion at the plants of four car build-and one railroad. Orders for about 00 of the 60-ft cars have already :n placed. Many of these will soon in service handling parts for the 64 model automobiles.

High-cube, high-capacity and ooth interiors are apparently the iracteristics which auto manufac-ers are seeking in forthcoming iipment. A major revision which s been made in rates for movements auto parts to their widely dispersed ;embly plants, auto makers feel, ıst be accompanied by a change in ight cars supplied them.

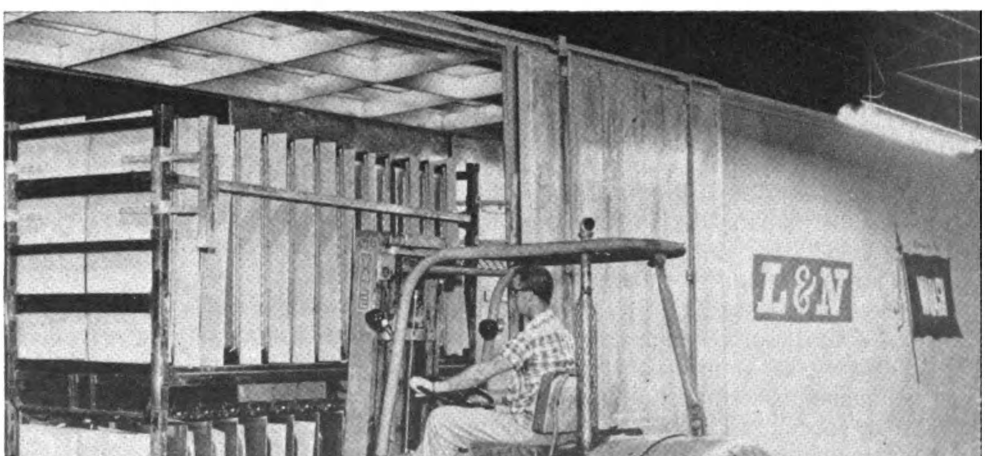
E. S. Knutson, Ford's director of iffic, has said that the new 85-ft car ll be tested "as a component of a new system to streamline the ship-ment of auto parts to assembly plants as well as to reduce damage and the physical handling of parts into and out of holding devices formerly used by railroads to prevent damage."

Today, assembled new automobiles are moving by rail. One of every three built in 1963 will ride a railroad from assembly plant to destination or distribution point. Multi-level rack cars have brought the rail share of finished-auto shipments from less than 10% a few years ago to an estimated 33% this year. Auto parts now move largely by rail. Yet at least one of the automobile industry's Big Three sees a parts-movement revolution coming that will overshadow even the up-heaval that the rack cars caused.

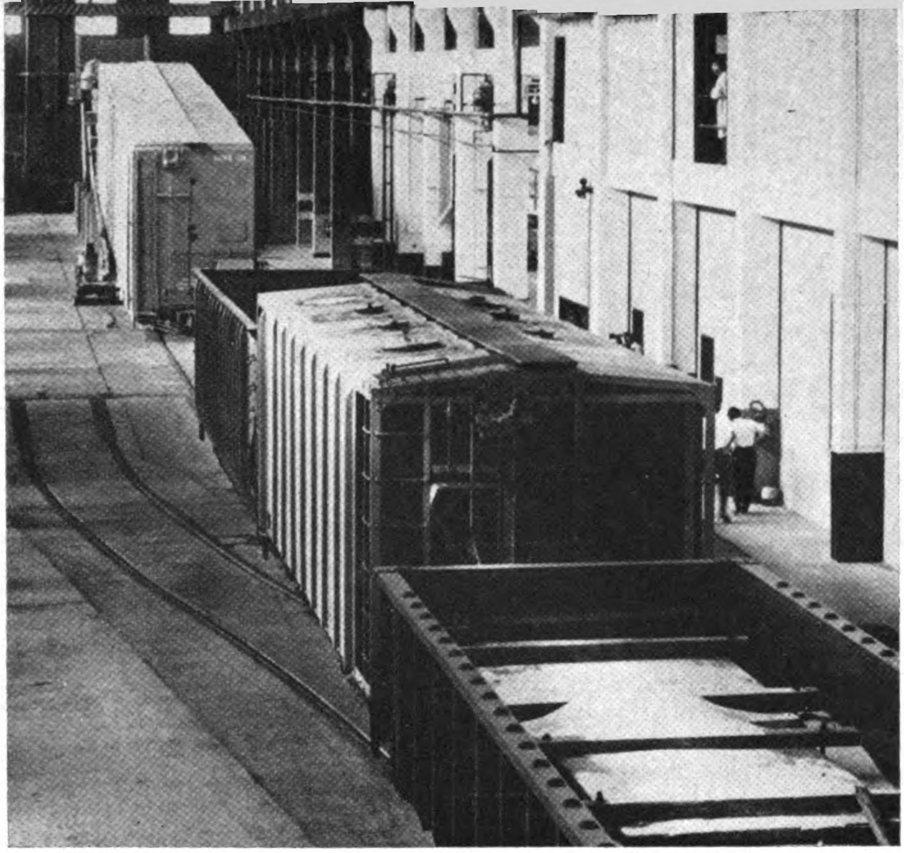
A year ago, Ford, Santa Fe, and Pullman-Standard built an 80-ft cush-ioned "container" of more than 9,500 cu ft capacity for low-density parts loading. Two months ago, Southern Pacific unveiled an 85-ft box car with 10,000 cu ft capacity built by White-head & Kales (RL&C, June 1963, p 48).

As yet, no orders have been placed for 85-ft parts cars. But Ford has indicated it will need about 2,700 along with 2,000 of the 60-ft models. Ford figures that 4,700 60-ft and 85-ft cars will replace about 9,000 of its 40-ft and 50-ft cars—and a projection for the entire industry points to a po-tential market for between 15,000 and 20,000 new cars, should all auto makers adopt the big cars as standard.

Inherent to Ford's approach to the parts-movement operation is a depar-ture from the now standard car-code system where a given car is outfitted



Double plug doors covering 18-ft opening on each side of car facilitate lift-truck loading of experi-mental 85-ft car with newly developed racks. Three railroads are working with ACF.



Experimental car with Freight-Saver cushion underframe was subjected to series of impacts at ACF's newly opened Technical Center prior to going into service between Ford plants.

with interior devices to handle specific items—Ford hoods or Comet quarter-panels. The new cars will be, according to Mr. Knutson, "clean on the inside"—plain box cars with no interior fittings.

Parts will be containerized. Loaded at the parts plant, they will move untouched in containers to assembly line, perhaps half-way across the country. Containers will be loaded to the eaves of the box cars, made possible by plug doors which permit loading to within 1 in. of the car roof.

While years ago manufacturers produced a minimum of different automobile models, this has changed. Each of the basic lines has been diversified so that, today, railroads must have a large number of cars fitted for handling only a single part.

The number of these coded parts cars, Mr. Knutson says, has doubled in recent years. "Each time we added a new code to fit a Comet hood or a Falcon quarter-panel, we made unique and specialized another part of the car fleet, rendering it less flexible to use." In determining transportation needs, Ford's traffic department has had to rely on public acceptance of various models for justifying the numbers of cars which railroads fitted for specific parts shipments. If one model's sales slumped, freight cars equipped to handle parts for that model sat idle.

"We were always in a position," Mr. Knutson says, "where we had an adequate number of cars on hand, but often emergency measures were necessary to enable us to meet our particular production at the moment. This meant railroads were not getting utility from their cars—and we were creating traffic problems unnecessarily." Ford's first step was to start thinking of the box car as a general-purpose vehicle—not a hybrid transportation unit. It had become a specialized container "to the point where it was no longer a box car."

Ford decided to apply the same principle that made the auto-rack cars so successful—design of a unit to take any kind of package shipped. Car utilization, the auto maker figures, should then show a spectacular improvement.

If containerization were the only object, Ford could perhaps have switched over, using the existing auto-parts car fleet. But the auto maker is also looking for maximum loading, along with maximum utilization of equipment—existing cars, figures showed, would produce an actual loss because these cars do not have the loading capabilities Ford required.

The 60-ft, high-density-parts car promises to become a standard without a long test period. According to Ford, at least 25 railroads have agreed to supply cars of a uniform sign—Santa Fe; Detroit, Toledo Ironton; Wabash; Norfolk & West Green Bay & Western; Missouri cific; Union Pacific; Western Pa Frisco; Louisville & Nashville; Chi & North Western; Rio Grande; Ch peake & Ohio; Rock Island; Milw kee; Southern; Southern Pacific; P sylvania; New York Central; E Lackawanna; Chicago & Eastern nois; Illinois Central Cotton B Texas & Pacific; Burlington, and B more & Ohio. At least four builde ACF, Greenville, Pullman-Stand and Thrall, along with the Santa Topeka shop—are now working them.

"We will have many of this type in service for the '64 model ye Ford reports, "and we will have m for the '65 and '66 models." F thinks in terms of 2,000 60-ft car replace about 2,800 smaller cars.

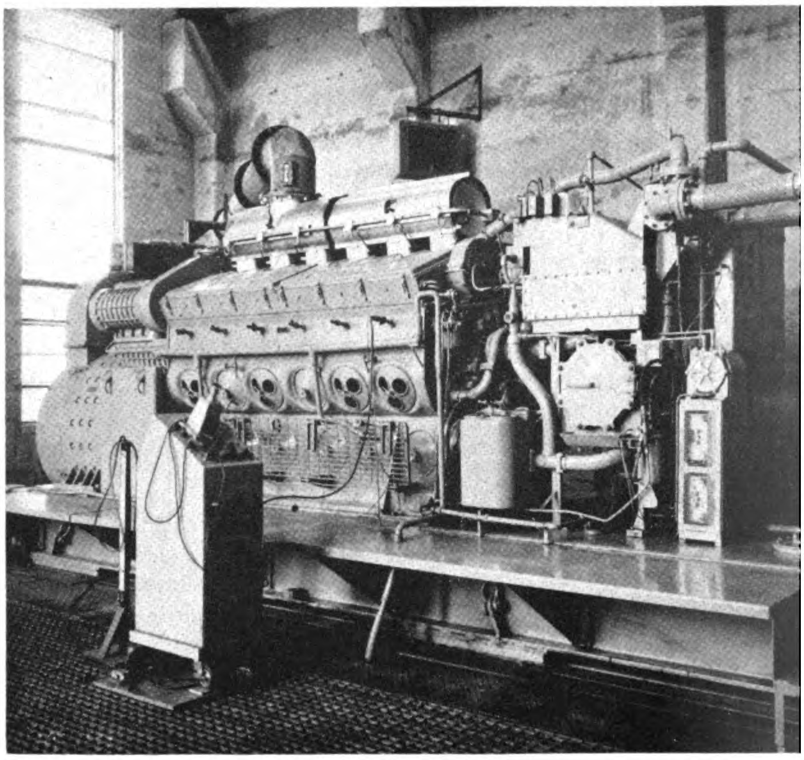
Knutson said his company requ ed development of the new equipm after it was found that the 40- or 5 general service box car no longer the requirements of high-quan damage-free shipping of bulky p of various shapes.

Modular shipping racks have b designed by Ford so that the new c may be loaded to maximum capa quickly and without the need for vices or dunnage to hold the load place. Double center-opening p doors, measuring 18 ft across and cated on either side of the car, per fork lift trucks to load the car within 1 in. of its roof.

The double plug doors are also u on the experimental 85-ft cars. It been equipped with an ACF Freig Saver hydraulically cushioned und frame having 20-in. travel. The ca carried on 70-ton trucks and, wi light weight of 93,000 lb, has a l capacity of 126,000 lb. It is 1 above the rail and 9 ft 10 in. wi These dimensions, say ACF, m clearances on all 27 railroads serv Ford and the clearances encount at the Ford plants themselves. C interior dimensions are: length, 8 4 in.; width, 9 ft 2 in.; height 12 ft

Before delivery, the car was s jected to a series of strenuous tests the new ACF Technical Center at Charles, Mo. It was exposed to 1,000,000-lb squeeze in the Cent static and dynamic fatigue test fixt and it was fully loaded and impa into a string of stationary cars speeds up to 11 mph.

anadian Diesels urn Crude Oils ı Laboratory and oad Experiments



Laboratory of Canada's National Research Council installed 12-cylinder GM 567C locomotive diesel engine coupled to GM D12 generator with output dissipated in GE air-cooled resistor bank. Satisfactory early results led to simultaneous road and laboratory work. Vapor pressures of crude oils and large quantities of filterable materials required redesign of the locomotive filter systems to assure reliability of service.

.el locomotives on the Canadian onal and Canadian Pacific have ı burning crude oil. Its use on bstantial number of yard and road motives followed extensive labor-y work conducted by the National earch Council of Canada.

imilarity between standard distil-s and crudes from Alberta oil fields ıite marked. Principal differences flash point which is lower for les and distillation range where show a higher final boiling point. AAR Mechanical Division Com-ee on Locomotives and Locomo-Fuels and Lubricants recently re-ed that while units burning these s had operated over two million s, "problems involving injector ıbility, wear of power assemblies, lubricating-oil life are not yet ed." Engine wear and oil deteri-tion are probably due to faulty in-or performance, they commented. 'ower assembly wear is about twice ıigh as in distillate-burning units. ›ricating oil life averages 20,000 es. To burn crude economically, life would have to be 50,000 miles l life of injectors 100,000 miles. roads are now trying to achieve se goals.

The Committee has suggested that erent materials might overcome ›sion and corrosion in injectors; de-ed crudes might also be used. Dilution, reason for oil changes, occurs primarily at idle. Work now being done seeks to control combustion at idle, limiting both dilution and engine parts wear.

There has been a great deal of experimentation in the U.S. and Canada on the burning of various types of fuels in diesel locomotives. Most of these efforts have been directed toward finding a less expensive fuel. A great deal of success has been achieved in burning residuals, blends, and various cuts of the refinery process. Each investigation has been directed toward the fuels readily available in the geographical area in which the railroad involved was operating. An important lesson from this work has been that experimental results obtained with any one fuel are characteristic only of this fuel and that each new fuel has its own features requiring individual testing.

The reasons for seeking to utilize fuels other than distillates are largely economic. The cost of diesel fuel at the present time represents approximately 50% of the total cost of operating a locomotive in heavy freight service. A fractional saving in fuel expense can, therefore, be expected to produce a substantial saving in overall cost, provided this saving is not offset by increased maintenance expense.

The CN-CP-NRC investigation was carried out to determine the possibilities of running locomotive diesel engines on Canadian crude oils. The investigation began with laboratory tests, and the first series of runs was made on standard No. 2 diesel fuel to furnish basic data for comparison with substitute fuels.

On the premise that crude oil would present a greater variety of problems with an engine employing the two-stroke cycle than would a four-cycle engine, it was decided to conduct the investigation with a General Motors V-type, Model 567C, two-stroke, 12-cylinder diesel locomotive engine.

Laboratory tests were carried out on three types of Canadian crudes. In making the test schedule for the engine, it was assumed that two running conditions of the diesel engine are extreme, full load and idle, and that intermediate loads would be less critical.

Because locomotive diesel engines operate for many hours at idle, long periods of idling were included in the test schedule.

- Part A. 50 to 100 hr during which engine and instruments would be adjusted; a complete set of readings made at each throttle position; and acceleration times between throttle positions determined;
- Part B. 400 hr of prolonged cycles of idle and full-load operation with readings taken every 2 hr;

• Part C. 500 to 550 hr of shorter full-load and idle cycles with readings taken less frequently.

The tests showed that the use of selected crude oils as fuels in diesel-locomotive engines is possible and practicable. In comparison with standard diesel fuel, the same rated horsepower with about 2½ % higher specific fuel consumption was obtained.

Accumulation of deposits and the wear of the engine under laboratory conditions were moderately greater than with standard fuel and did not give cause for concern. The effect of higher vapor pressure of crude oils, lubricating-oil dilution, fuel filtration and corrosion were overcome successfully. Necessary modifications to the engine were of a rather minor nature, not affecting the engine's ability to burn standard fuel.

GM spherical-valve injectors performed satisfactorily with standard diesel fuel, but when used with crude oil caused excessive dilution of the lubricating oil. American Bosch needle-valve injectors were substituted which overcame the oil dilution but required a larger fuel pump in order to obtain rated horsepower with crude-oil. GM needle-valve injectors performed satisfactorily with the smaller standard fuel pump and were used in all succeeding tests. These have an opening pressure of about 3,000 psi as compared with 1,200 psi for the GM spherical-valve injector.

Smoke samples taken at each notch showed that the exhaust was generally clearer with needle-valve than with spherical-valve injectors. This occurred with standard diesel fuel and was still more pronounced with crude oil.

The first serious trouble encountered in operation on crude oil occurred after 158 hr of Part B of the 1,000-hr running schedule with the first crude tested. Excessive dilution of the lubricating oil forced discontinuance of the 1,000-hr schedule in favor of a special investigation.

No dilution occurred during a 100-hr continuous operation at idle, nor in a subsequent 100-hr run at Notch 7. When the throttle was reduced to idle after full-load operation, fuel consumption reduced only to 40 lb per hr, about double the normal rate, and dilution occurred. Stopping the engine for 2 or 3 min and then restarting it restored the fuel consumption at idle to its normal 20-lb/hr rate. Normal consumption at idle was also observed when the engine was started cold; no dilution took place.

A thorough check of the governor and its linkage failed to show any defects. Erratic injector performance was determined to be the cause. When the spherical-valve injectors were replaced by needle-valve type, no oil dilution occurred.

Considerable effort was directed toward improving the spherical-valve injectors sufficiently to permit their retention in engines burning crude oil to avoid the expense of changing to needle-valve injectors.

The spherical-valve injector has a long fuel duct or tunnel between the check valve and spray holes. In addition, the check valve, being actuated by pressure differential between the fuel system and the air compressed in the engine cylinder, does not very effectively close the upper fuel duct. The volume of fuel which promotes dribbling and clogging of the spray holes is much larger in spherical- injectors. The needle, actuated by high-tension spring, closes the duct just above the spray holes.

The problem of fuel filtration not serious with the Acheson more crude first tested. The first ging of sintered-bronze filters occ after 758½ hr. During the 1,00 run with Texaco crude, cloggin sintered-bronze filters took place approximately 8 hr of operation.

The tests showed that sin bronze filters had much lower ency than assumed and seemed the most unsuitable for fuels waxy substances which very easily their long, irregular passages. In of trying to separate the waxes the crude oil, the sintered filters removed from the engine and co sock cartridges in the dual filter replaced by cartridges of 150 stainless steel. These filters separ solids of the same size as those moved by sintered bronze, but less prone to clog and passed w which could be burned in the engi

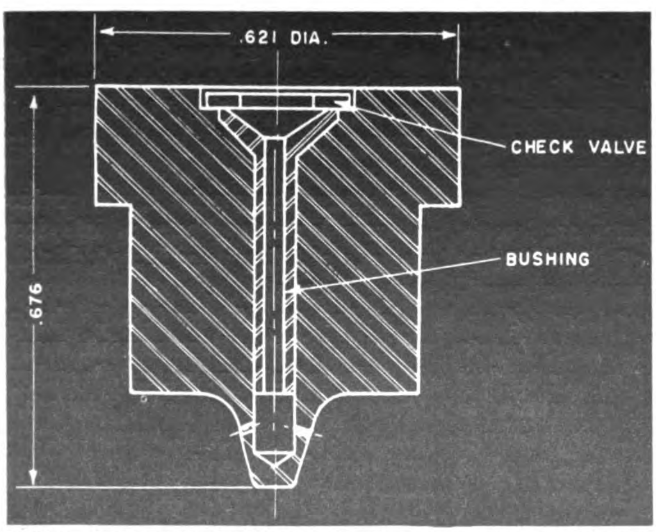
After the 1,000-hr run on Te crude oil was completed, the inj barrels, plungers, and needles sho a dark discoloration attributed to quering. Examined on the hand-p stand, the injectors showed exces leakage through the plungers w tested with standard fuel, but wo hold pressure when crude was u Examination of injector plungers needles showed pitting which ascribed to corrosion.

Some approaches to the problem

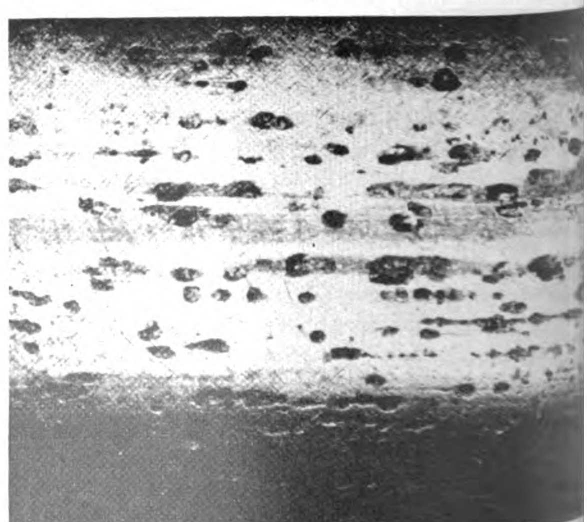
• Crude oils with low corro characteristics can be used;

• Oils can be treated to re

(Continued on page 42)



Bushing of spherical-valve injector's fuel tunnel and dropping of opening pressure proved unsuccessful. Needle-valve injectors are used.



Corrosion of plunger, detected in laboratory, has proved serious in service. New materials have been suggested for injector parts.

ıtity rate has been established for movement of 50 of these 100-ton cars on one day and on a single bill of lading.

ellets To Move in 100-Ton Hoppers

Iovement of iron ore pellets from ıine soon to be opened 70 miles thwest of St. Louis has resulted in [issouri Pacific order for 400 hop- cars of 100-ton capacity. The nstown, Pa., plant of Bethlehem :l has recently completed delivery ıese high-capacity cars.

n ordering its new hoppers, MP :ified that they have sufficient cu- capacity to enable them to trans- t 100 tons of coal—a commodity :h lighter than ore pellets. Chosen he basis for the design was the 70- , 2,603-cu ft standardized hopper which was developed several years by a committee of Chesapeake & ıo, Norfolk & Western, and Penn- 'ania mechanical officers (RL&C, :. 1958, p. 22). The so-called mmittee" car, which has since been ıpted as the AAR alternate standard design, has an inside length of 39 ft 10 in., a coupled length of 43 ft 6 in., an inside width of 9 ft 9½ in., and an overall height of 11 ft over the sides. It weighs 54,100 lb. In this car commonly available mill sections and plates are used to reduce initial cost. Maintenance costs were to be minimized by design features; the car is expected to operate for at least 20 years without major rebuilding being necessary.

Norfolk & Western and Bethlehem have since built elongated 85-ton versions of the 70-ton car. The 100-ton MP car represents a further enlargement with practically all the original characteristics and cross-sectional dimensions retained. The triple-hopper arrangement of the 70- and 85-ton cars has become a quadruple design in the 100-ton, 3,209 cu ft model. Inside length is 47 ft 11½ in., coupled length is 51 ft 8 in., and light weight is 62,700 lb.

All body components contacting the lading are Bethlehem's low-alloy, high-tensile, corrosion-resistant Mayari-R steel. These include the ¼-in. side sheets; $\frac{5}{16}$-in. upper-floor sheets; and ⅜-in. intermediate floors, hopper chutes, cross-ridges and longitudinal hoods. The 13 flanged U-shaped side posts on each side are riveted to side sheets, bolsters and longitudinal framing members. Top chords are 5 by 4½ in. bulb angles; side sills are 5 by 3½ by ⅜-in. angles.

Center sill between bolsters is formed of a pair of AAR Z-12 sections weighting 41.2 lb per ft. Draft sills, separate castings welded to the center sill 10 in. inboard of each bolster, incorporate center braces, center plates, front and rear draft lugs, strikers and coupler carriers. Body bolsters, 24-in. wide-flange beams weighing 94 lb per ft, have top flanges tipped 30 deg to support floor sheets. The three crossbearers, 14-in. wide-flange beams weighing 43 lb per ft, have top flanges formed into V shapes to support cross ridges.

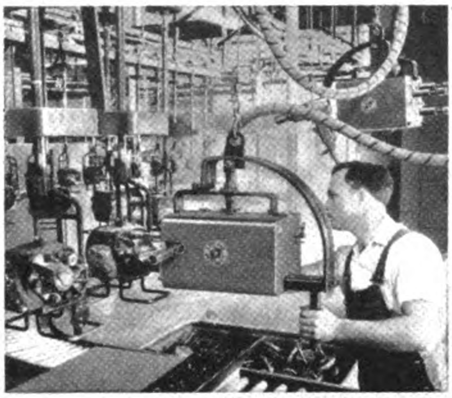
Trucks are 100-ton pedestal type with ASF Ride Control snubbers and 2½-in. travel springs. They have Bethlehem 36-in. one-wear wrought-steel wheels, Bethlehem raised-wheel-seat axles with 6½ by 12 in. journals and Timken roller bearings. All cars are fitted with Cobra composition brake shoes.

Partial List of Specialties

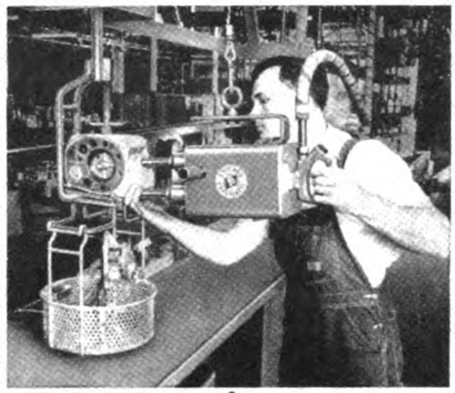
frames	Symington Div., Symington Wayne Corp.
bearings	A. Stucki Co.
ıgs	Union Spring & Mfg. Co.
ıbers	American Steel Foundries, Inc.
ɜr bearings	Timken Roller Bearing Co.
ɜstal adapters	
nd keys	National Castings Co.
t gear	W. H. Miner, Inc.
t sills and side braces	Scullin Steel Co.
.e equipment	Pittsburgh Forgings Co. Schaefer Equipment Co. Westinghouse Air Brake Co.
brake fittings	Dresser Mfg. Div., Dresser Industries Illinois Railway Equipment Co.
ιe regulator	American SAB Co.
ιe beam wear plates	Unit Truck Corp.
ιe shoes	Railway Friction Products Co.
Brake shoe keys	American Brake Shoe Co.
Brake steps	American Steel Foundries, Inc.
Couplers and bolsters	Symington Div., Symington Wayne Corp.
Coupler release	Standard Railway Equipment Div., Stanray Corp.
Coupler yokes	National Castings Co.
Door frames and fittings	Wine Railway Appliance Div., Unicast Corp.
Corner castings	National Castings Co.
Fasteners	Elastic Stop Nut Corp. of America Gustin-Bacon Mfg. Co. KSM Products, Inc. MacLean-Fogg Lock Nut Co. Townsend Co.
Defect car holder	Western Railway Equipment Co.
Paint	Minnesota Mining & Mfg. Co. Pittsburgh Plate Glass Co.

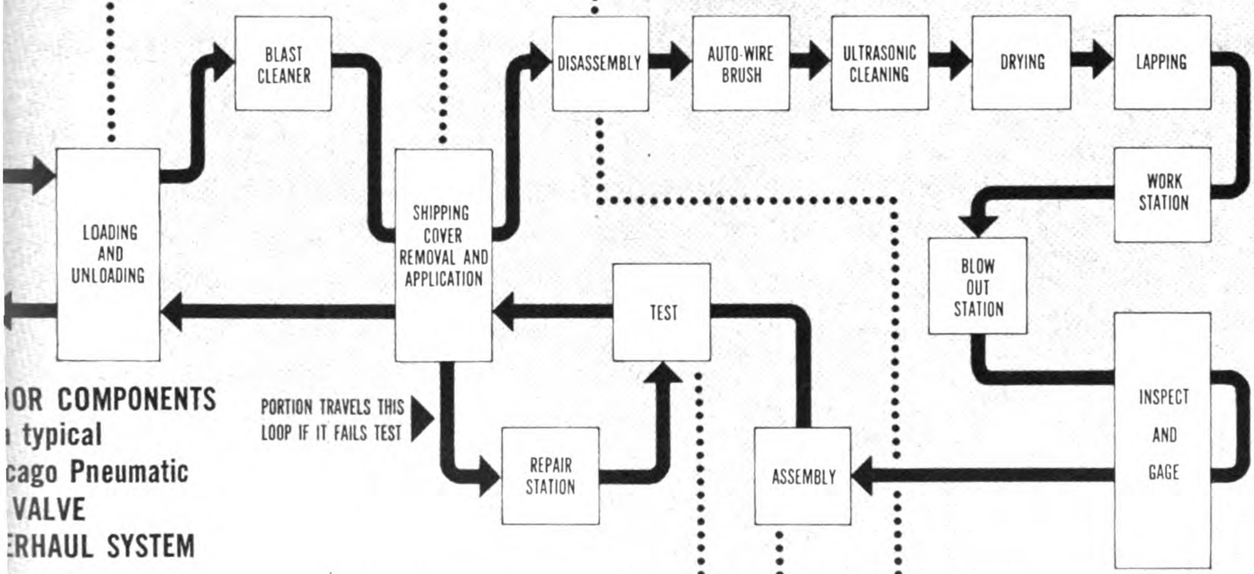
t **Coast Line's,** mechanized overhaul ıop in Waycross, Ga., AB Valve sets tart their journey at this conveyor ›ading and unloading station. Each alve set is placed on its own individual arrier . . . next stop, the cleaning rea. A typical test section arrangeıent appears in background.

Removing shipping covers from emergency portions. CP Multi-runners, suspended from overhead balancers, remove cover retaining nuts in seconds.

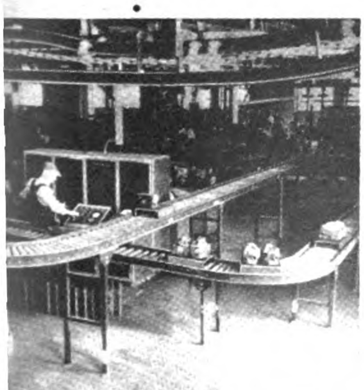


Emergency portions pass through the disassembly area in a continuous flow. CP Multi-runners keep the line moving on schedule.

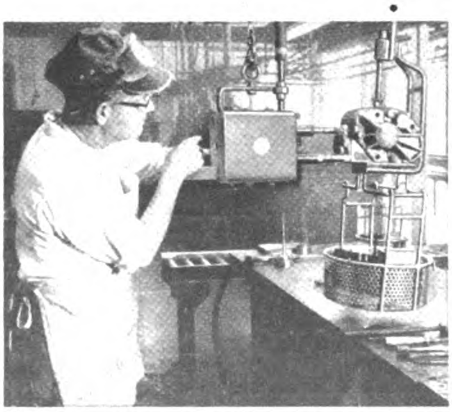




ıOR COMPONENTS
ı typical
cago Pneumatic
VALVE
ERHAUL SYSTEM



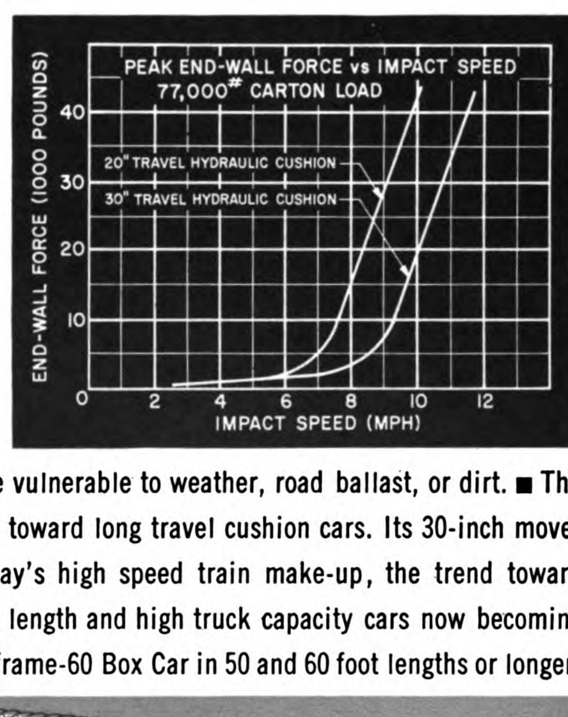
End of the line . . . final inspection and test of completed units.



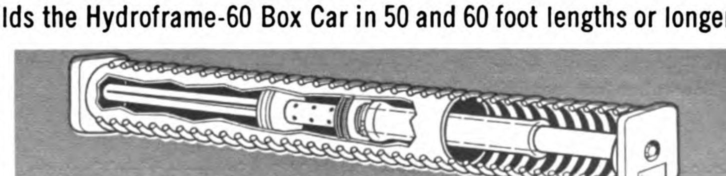
Replacement of check valve covers is handled efficiently as emergency portions move through the assembly station.

General view of disassembly area for service and emergency portions. Multi-runners are suspended at each operating station.

·inch travel concept practical and to meet the ecial requirements of railroad service, Pullman-andard designed a new hydraulic cushion gear. ring impact this hydraulic cushion maintains e same level of force throughout the entire oke. It's a self-contained unit that does the en-e cushioning job . . . no extra components or parate assemblies, even the "return to neutral ring" is an integral part of the cushion unit. And, e Hydroframe-60 cushion unit contains no exposed,



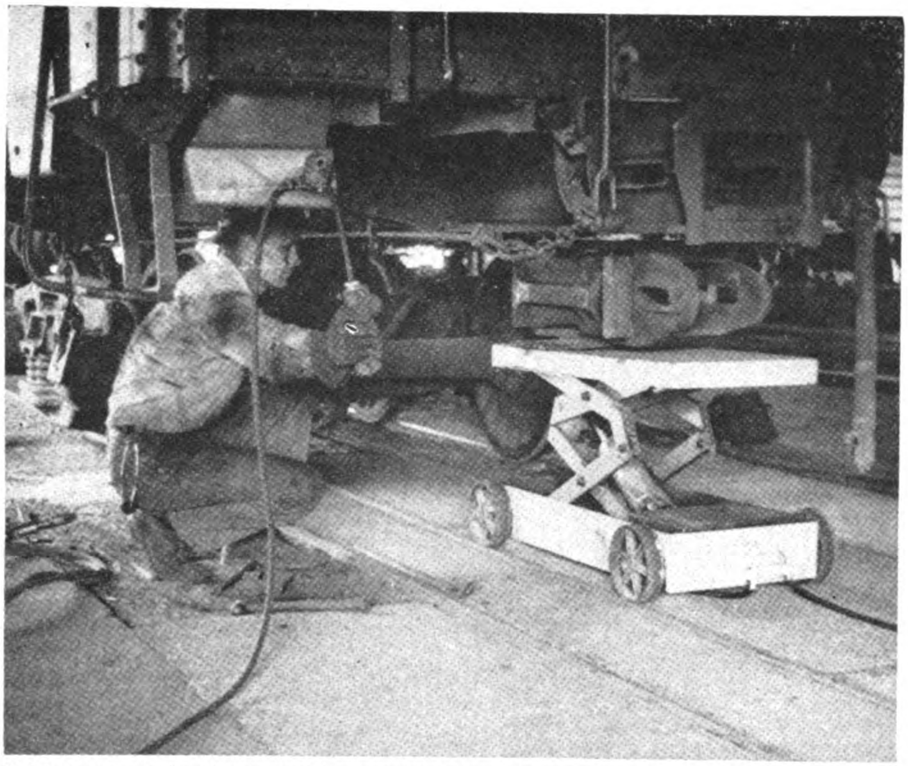
iding,close-tolerance fits and seals which would be vulnerable to weather, road ballast, or dirt. ■ The ccess of the P-S Hydroframe-60 has started a trend toward long travel cushion cars. Its 30-inch move-ent supplies increased protection required by today's high speed train make-up, the trend toward ghter packaging and the heavier loads in the longer length and high truck capacity cars now becoming mmonplace. ■ Pullman-Standard builds the Hydroframe-60 Box Car in 50 and 60 foot lengths or longer, d in truck capacities up to 100-tons. ■ dd your railroad's insignia to those own above. You will enjoy a new eedom from damage claims, re-uced car maintenance and more satisfied customers. or detailed information phone or write your nearest ullman-Standard Sales Office or G. L. Green, ice President-Marketing, Chicago.


Hydroframe-60 Cushion Gear Assembly

*Covered by U. S. Patent Nos. 3,003,436, 3,035,714, 3,035,827, other patents pending

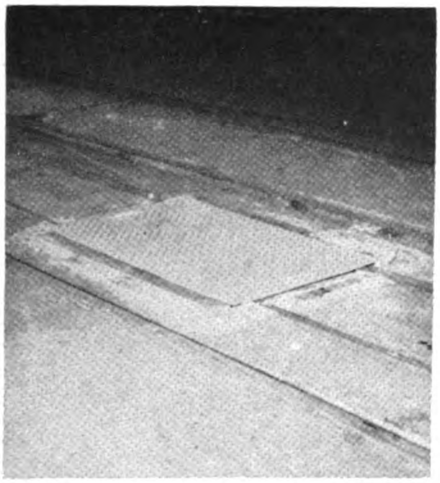
PULLMAN-STANDARD

A DIVISION OF PULLMAN INCORPORATED
200 SOUTH MICHIGAN AVENUE, CHICAGO 4, ILLINOIS
NEW YORK, PITTSBURGH, BIRMINGHAM, SAN FRANCISCO
J. C. FENNELLY CO., REPRESENTATIVE



Pushbutton control makes it possible to control the jacking device while remaining clear of the heavy draft gear as it is moved into or out of the pocket in end of car's underframe.

SAL Handles Draft Gears With Hydraulic Jack



Floor plate covers jack and its carrier when it is retracted below floor when not needed.

Carrier, yoke and gear can be assembled on jack table before being rolled under car.

A hydraulic jack is making removal and application of draft gears faster and safer for the Seaboard. The device has been installed in one of the production tracks in the freight-car shop at Jacksonville, Fla. Normally, this shop is engaged in upgrading and heavy repairs for SAL freight cars.

Late in 1962, it was decided to abandon the hand truck which had been used for draft-gear work. In its place, the road purchased a hydraulically operated scissors jack of 2,000-lb capacity which has been installed on a four-wheel carrier. The carrier operates on a narrow-gauge track between the regular running rails of t shop track. The narrow-gauge tra extends for approximately 40 ft. At center is a pit into which the jack a its carrier can be lowered when frei cars are moved on the production li Normally, the device remains in t pit covered by a floor plate.

Control for the pneumatic lift a the power unit for the hydraulic sy tem are mounted along an adjace shop wall. At the end of an extensi cord are the push-button controls f the hydraulic units, making it possib for the operator who is removing installing a draft gear to hang the co troller from the car on which he working. The hydraulic line for pow ing the jack is mounted on a retra able hose reel in the pit. When the u is raised to floor level to be roll under a car, it pulls this hydraulic li along with it. The line passes over small pulley at the edge of the pit a continues to unwind until the carri is positioned under a car's draft-ge pocket lying on the floor between t rails. When the device is returned t the pit, the hydraulic line automat cally returns to the reel.

In typical heavy repair operation the SAL does not replace the dra gears on each car. Replacement is de termined by a shop supervisor wh inspects cars as they come along th line.

The station at which the hydrau lic elevating device is installed is th at which coupler and draft-gear wo is performed. When it is necessary t change a draft gear, the elevator wi be raised from its pit, moved under th car, and brought up under the carrie irons. The carman then burns the rivet holding these irons, dropping them and the draft gear they support on th table which forms the top of the jack The jack is then lowered and brough out from under the car where th draft gear can be handled by an ord nary hand truck. The carrier iron remain on the table, and the replace ment draft gear is placed on top o them. The elevator is then pushe back under the car and raised to com plete the installation.

A possible future use for the devic may be removal of the hydraulic uni from the center sills of the SAL's flee of cushion underframe cars.

When the time comes for periodi servicing of the hydraulic units o these cars, it is probable that the ele vating device can also be used for the removal and application.

21

Roll Them Out Like New

Machine Assembly

All of the motor and generator parts ve been reconditioned. All that reins is assembly. If this is done operly, a machine will be ready to /e thousands of miles of satisfactory rvice.

There are many ways to assemble machine. The method used in any rticular shop will depend upon facil-es and work volume. If shop per-nnel are unfamiliar with the ma-ine, it is best to follow the manu-cturer's instructions carefully. The ethod he recommends has been oved satisfactory. As you become miliar with the equipment, you may er develop methods better suited to ur shop. For instance, some shops semble traction motors in a horizon-. position; others turn them on end. me others use a trunnion arrangement to take advantage of both positions.

The same applies to special tools. A few are almost an absolute necessity, but often something around the shop will serve to do the job. As work volume increases, it may be well to develop tools beyond those recommended by the manufacturers. So much for the setup. Now for a few pointers on important details.

Coils should be assembled in the frame while hot. Be sure they are clamped tightly between the pole tips and finished bore of the frame. Connections should be made as shown on the connection diagram.

s twenty-first article in the series covering avy maintenance of locomotive electrical uipment is by R. F. Soltis, Locomotive and Car uipment Department, General Electric Co., e, Pa. Part 20 appeared in the April issue.

Bearings

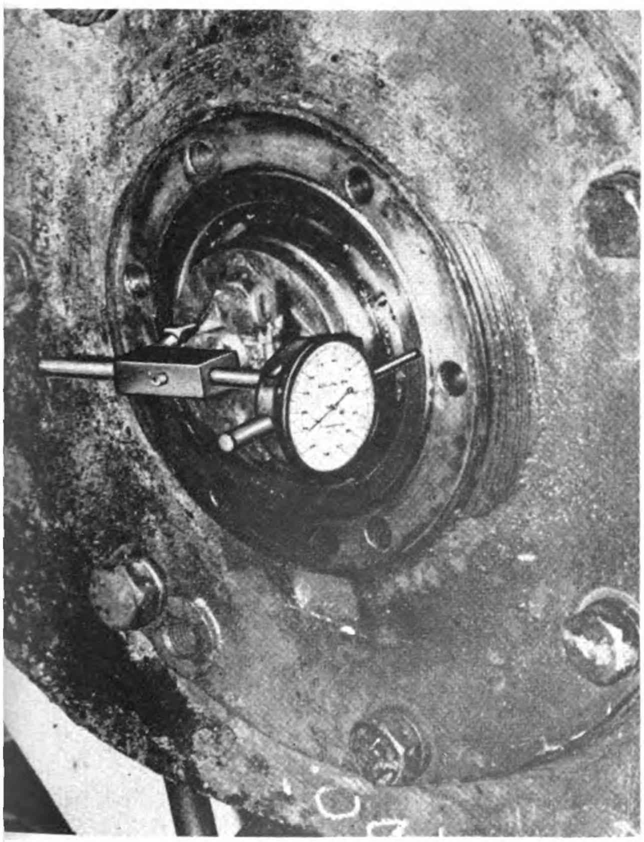
A simple check of three items will tell whether a bearing has been properly assembled on a shaft and in a frame. These are alignment, clearance and end play. When properly aligned, the bearing is mounted on the shaft and in the frame so as to be at right angles to the axis of rotation. Alignment can be checked with a dial indicator.

A good way to check clearance on ball and roller bearings is to place a flat feeler gage on a race without a flange. Turn the shaft until a roller rests on top of the feeler. If the feeler can be pulled out with a reasonable drag, the bearing has clearance. Remember, the roller will roll over a considerably thicker feeler than can be pulled out, but this is not the amount of clearance.

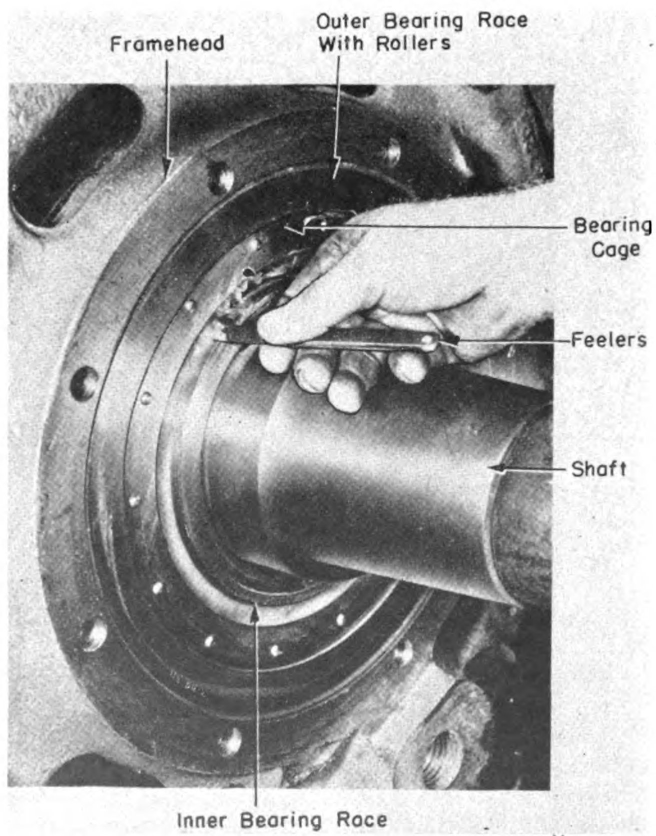
End play can be measured by moving the shaft with respect to the frame and measuring the distance traveled with a dial gage as described in Part 8 (RL&C, April 1958, p 56) of this series.

Lubrication is a very important item in connection with bearings. Measure the quantity of grease very carefully — and don't yield to the temptation to add "a bit more!" It's best to use a

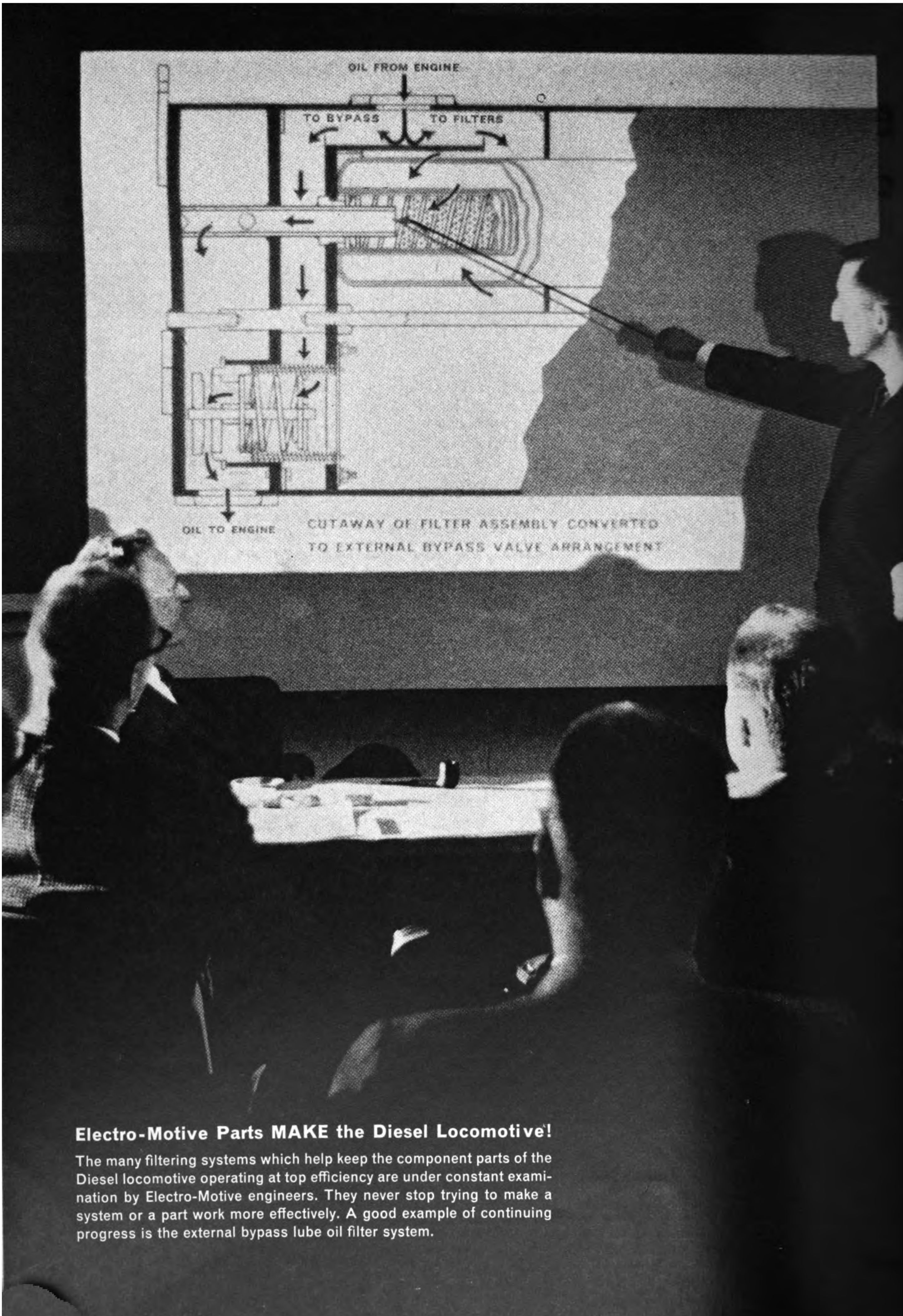
(Continued on page 40)



earing runout can be checked with dial indicator. Proper mounting of earing places it at right angles to axis of armature rotation.



Feeler gauge can be used to insure that rollers have proper clearance. Technique of measurement must be understood to insure results.



Electro-Motive Parts MAKE the Diesel Locomotive!

The many filtering systems which help keep the component parts of the Diesel locomotive operating at top efficiency are under constant examination by Electro-Motive engineers. They never stop trying to make a system or a part work more effectively. A good example of continuing progress is the external bypass lube oil filter system.

External bypass lube oil system delivers cleaner oil to the engine

Put it to work on your earlier model locomotives!

Cleaner oil in the engine means *longer life for all wearing parts, reduction of carbon deposits in the oil cooler,* and *added protection to maintain close engine tolerances.*

New bypass design

The 40 psi *external* bypass lube oil filtering system, created through minor physical alterations to the original 17 psi *internal* bypass system, routes bypass oil around the filter chamber and directly back to the engine. This prevents carbon deposits on the surface of each filter cartridge from being washed back into the oil and eventually into the engine itself.

Reduces maintenance

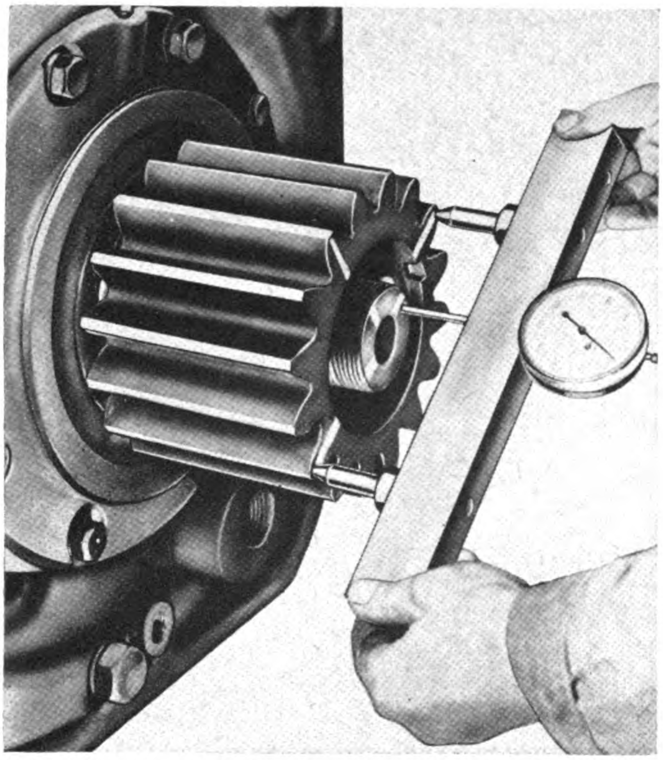
The external bypass valve system offers reduced maintenance benefits, too:

- washing of carbonaceous material from filters is eliminated—assuring less frequent parts replacement.
- single 40 psi external bypass valve is maintenance-free.
- inlet baffle and new cradle permit use of cageless cotton cartridges.

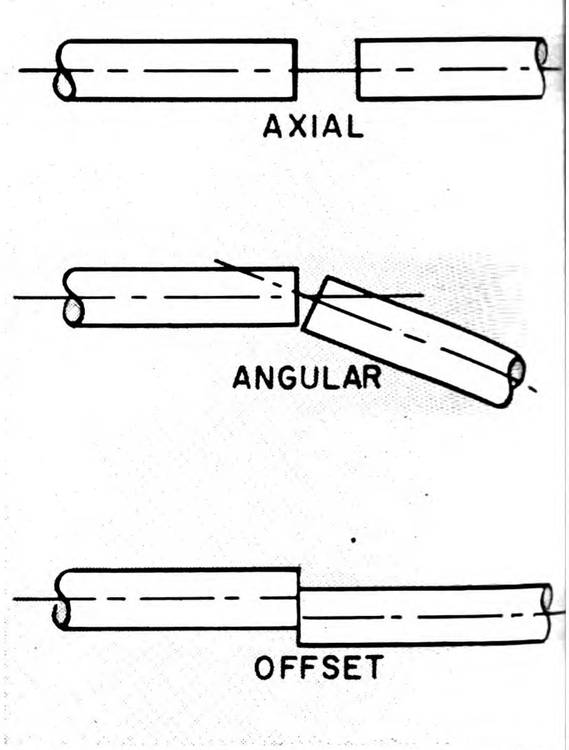
The Electro-Motive lube oil bypass conversion kit is all you need to put this improved filter system to work on earlier model locomotives. No extensive welding or additional piping is necessary.

Ask your Electro-Motive representative to give you further details. Or, contact Electro-Motive Division, LaGrange, Ill.

ELECTRO-MOTIVE DIVISION • GENERAL MOTORS
LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*
In Canada: General Motors Diesel Limited, London, Ontario



Pinion advance gauge indicates proper mounting of vital component. Taper fits require careful assembly to give satisfactory service.



Couplings can be affected by offset, angular, or axial misalignm shafts between which they are used. Torque values are important

grease recommended by the manufacturer of the machine. Do not mix brands. Be extremely careful to keep lubricants, particularly greases, clean. Be cautious about using grease guns. Some types of grease can be ruined by forcing them through small orifices.

If the bearing is held on the shaft with an interference fit, either heat or pressure must be used in applying it. Avoid excessive or localized heat, as it may damage the bearing. Put the pressure on uniformly, and never so that force is transmitted through the rolling elements. When clamping a bearing be certain that the pressure is uniform all around. This will avoid distortion of the race.

Most of the critical items about armatures involve handling during assembly. What was said in Part 3 (RL&C, June 1957, p 52) about disassembly of machines applies equally well here. When the armature reaches the assembly area the commutator will usually be wrapped with cardboard to protect the surface during handling. If the cardboard is not in place, put some on. Keep this in place until the very last to avoid nicks and bumps that could cause unnecessary damage and rework. When inserting an armature into a frame, long lead studs may be used as guides to prevent accidental bumping of the coils and commutator.

Be careful not to bump or bend the brush holders during assembly of the machine. Even a slightly improper location of a brush on the commutator can affect the output of the machine. Also, brushes are quite easily damaged, so keep them out of the holders until the very last.

Connections to field coils and brush holders should be tight. If they are loose, the result may be very erratic performance of the machine in service. When assembly is complete the external leads should be carefully tied to the machine frame so they will not be damaged during handling.

Mechanical Items

Taper fits are widely used. Often they are the sole method of holding, neither keys nor nuts being used with them. Their reliability has been proved, but proper application is a "must." There are several things to watch.

Mating parts must have the same taper. Careful bluing will enable you to check this. If bluing is lightly applied to one part which is then placed straight on the other part and removed, you can see on the clean mating part the area which will be in contact during assembly. This will show improper taper and raised areas. Be careful not to use too much bluing and do not rotate the parts when they are together because contact areas then appear larger than they really

After checking taper make both mating surfaces are clean. cleaner the parts, the better the fit hold.

The final step to success with fits is use of the correct amount of vance. Always measure the adv after the parts are fitted. If it is within the specified limits, remove reapply the part. "Just on" is not enough for a taper fit. It's "how that counts.

Gaskets are so simple they get little attention. But they can improperly applied. Bolts may tightened so that one part of the is excessively clamped while parts have little or no clamping critical applications the manufac will probably indicate a certain tightening order and specify to values. Otherwise a good rule is tighten bolts in diagonally opp pairs and make several rounds creasing the torque with each rou

Shims are used to make up for ations in machine parts. Shims give trouble because of minor sights. The proper number and should be selected to give the fit. Shims sometimes may not uniform thickness. While the vari may be almost unmeasureable for shim, it can add up to several

sandths of an inch in a stack. The resultant misalignment when assembling parts can cause a service failure. Always measure a stack of shims at several points around the edges and correct any variations before applying. This can sometimes be done by turning shims over if the holes are properly spaced.

Many types of couplings are built so they can take some misalignment. They may be used for offset, angular or axial misalignment or a combination of these. One thing to remember when applying couplings is to torque up the bolts to the values specified. Usually these bolts are not expected to carry the load, but to hold the parts together tight enough so the load is transmitted by friction.

Backlash and alignment of gears should be checked after assembly. Backlash is easily measured by attaching a dial indicator to one gear and rotating this gear while holding the mating gear still. Manufacturers usually specify the amount of backlash required. One way to check alignment is by bluing. If several teeth of one gear are lightly blued and the pair rotated, an impression of the contact area is left on the clean gear. A little practice at observing the results will enable the assembler to judge the alignment and decide whether or not corrective steps should be taken. Spur gears are fairly easy to check. Hypoid and other complex gears may give the beginner some trouble. The manufacturer should be able to give information on how a good match should look.

If the machine will not be put into service at once, unpainted machined surfaces, such as rabbet and taper fits, should be protected with an anti-rust agent.

Thermal Expansion

While heat can be a great help for making shrink fits during assembly of a machine, it can cause trouble in service. When a machine is returned because it is "bound up," the assembler questions responsibility because "it was free when it left here." The trouble may be thermal expansion, the fact that different [illegible] different rates when [illegible]

For instance, [illegible] faster than steel. [illegible] num fan running in a [illegible] hot, it may use up all [illegible] bind. Therefore, clearance[illegible] checked against a [illegible] assemblies of this nature.

If a gear shrunk on [illegible] heats up faster than the [illegible] will lose some of its ho[illegible] If the gear was mounted [illegible] vance just a little short of [illegible] amount it may slip.

If the internal clearance [illegible] ing is just a little short [illegible] shaft fit was too heavy, an[illegible] race runs warm because [illegible] surrounding area are ho[illegible] outer race is cooled by the [illegible] its housing, bearing may [illegible]

Doing a good assembly [illegible] art. The explanation [illegible] will help considerably in [illegible] results. Remember, go[illegible] practices may mean the [illegible] tween equipment failure [illegible] ful operation.

Canadian Diesels Burn Crude

(Continued from page 30)

their sulfide content, or a corrosion inhibitor can be added;

- Corrosion-resistant materials can be employed for injector parts.

Noncorrosive crude was tried by the CNR in field service with good results. In the NRC laboratory, chrome-plated plungers were tested. After 958½ hr, the chrome-plated plungers did not show signs of corrosion on working surfaces, but helices were blackened, probably because of insufficient chrome-plating.

Prior to the start of the tests, the engine was dismantled and the parts which are subject to the greatest wear were measured. After the 1,000-hr run on standard fuel, the wear of the power assembly components was negligible. For example, the liner wear which is widely considered to be most representative of general engine wear averaged 0.0003 in. The maximum liner wear after the running periods on crude oils was about 50% greater than on standard fuel.

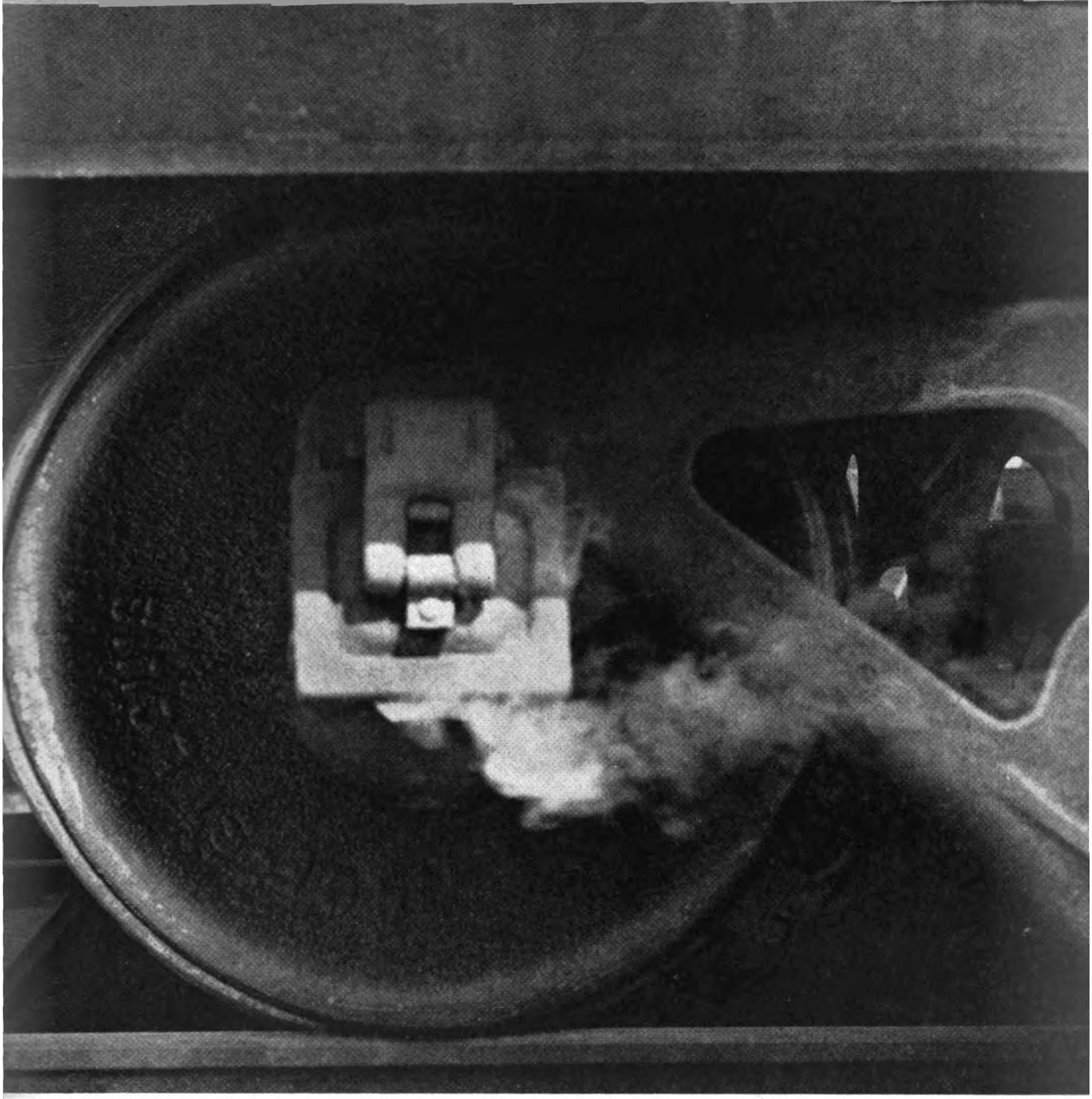
In view of the results obtained in the laboratory with first crude oils, it was decided to carry out field trials on engines in locomotives operating in normal service. At first, crude oil was used in switchers; subsequently, the tests were extended to road locomotives. These field tests were carried out concurrently with the laboratory tests and so arranged that the field and laboratory tests complemented one another. All the locomotives were equipped with General Motors 567 type engines of 900, 1,500 and 1,750-hp ratings.

One of the first observations made during the road test was the more frequent changes which had to be made of the filter elements. In accordance with laboratory results, the sintered bronze filters were removed and the cotton-waste filters replaced with mesh filters. The by-pass valve on the cotton-waste filter container was blocked off to insure full-flow filtration.

Different crude oils may exhibit a difference in corrosivity which has little relationship to the total sulfur content of the crude. The lack of correlation between sulfur content and corrosion rating is believed to result from the relationship between the amount of free and combined sulfur.

Certain classes of road [illegible] have shown a tendency to [illegible] allowed to idle for long pe[illegible] condition has been previo[illegible] enced with certain engin[illegible] standard No. 2 fuel and wa[illegible] tributed to low cooling wat[illegible] ture and cold weather. As [illegible] formation of sludge, engine[illegible] on crude oil have shown a te[illegible] wards a greater rate of wear [illegible] assemblies and a greater rat[illegible] cating-oil deterioration. The [illegible] wear rate has been measured by [illegible] trographic analysis of the lubr[illegible] oil. Deterioration of the lubr[illegible] oil has been indicated by a grad[illegible] crease in lubricating-oil viscosit[illegible] an increase in insolubles.

The relatively high pour point [illegible] crude oils has not caused trou[illegible] ambient temperatures as low as [illegible] 35 F. No pumping or mesh-filter [illegible] culties were experienced even [illegible] the ambient temperature was [illegible] low the oil's pour-point temp[illegible] Readings of the fuel system te[illegible] tures taken during cold-weather [illegible] ation on the road showed that [illegible] turn fuel coming from the [illegible] has been sufficiently warmed [illegible] the fuel-tank temperature at [illegible] mum of 65 deg F above ambie[illegible]



You'll have fewer hot boxes with the 3 unique advantages of Texaco Journaltex HD.

xaco Journaltex HD can help reduce ur hot box set-off rate by coping with oblems that non-additive type oils nnot handle: friction . . . abnormal it load . . . low oil viscosity. Specifi-lly, here's how it works:

% less friction . . . A special additive ves Journaltex HD a 60% lower fric-n coefficient under heavy load than ost non-additive type oils. Result: wer operating temperatures!

8 times greater film strength . . . Actual tests prove that Journaltex HD retains its protective oil film at a pressure 8 times greater than the failure point of a non-additive type oil. Result: 8 times greater load-carrying capacity!

Minimum bearing metal displacement . . . A built-in characteristic hinders gross bearing metal removal by redistributing minute amounts of babbit. Journaltex HD actually assists in reseating the bearing. Result: fewer scored, worn and misaligned bearings!

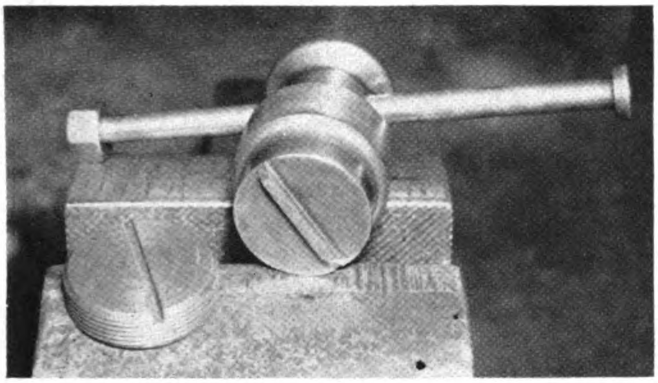
For full details on how Journaltex HD can improve your hot box set-off record—actually cut lube costs—call the nearest Texaco Railway Sales Office in Atlanta, Chicago, New York, St. Louis, Minneapolis and San Francisco. Or, write to Texaco Inc., *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

TEXACO

Throughout the United States • Canada • Latin America • West Africa

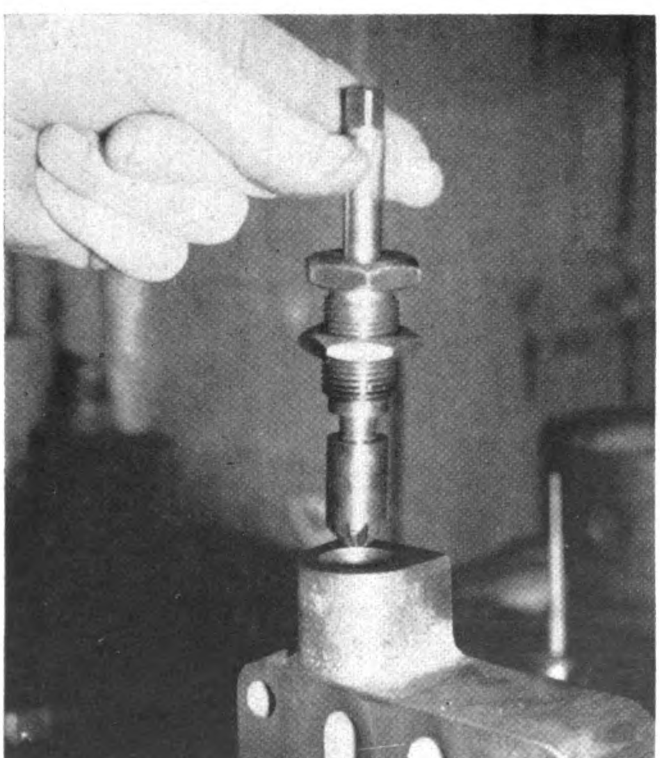
Diesel Repair Time Savers

Valve-Cap Tool



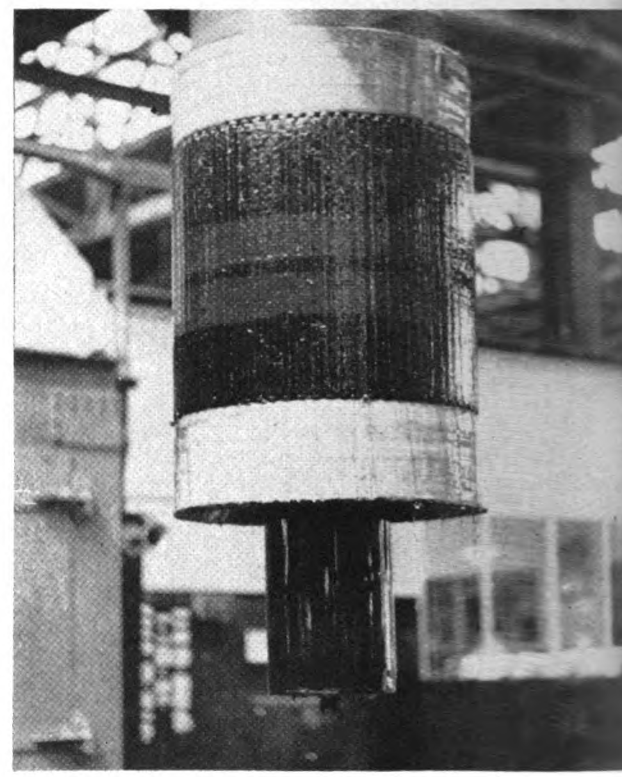
This special tool is used at shops of the Illinois Central to remove and apply caps covering the Michiana oil-filter relief valves. The device is made of 1¾-in. round steel and has a ⅛-in. x 1$^{15}/_{32}$-in. screwdriver tip on the end which fits into the cap recess.

Valve-Seat Reamer



A special reamer with ten 45-deg, 0.712-in. diameter flutes is used by the Illinois Central to rework the valve seat in oil-relief-valve plates of Gardner-Denver air compressors. After seat portion is reamed, the valve is refaced either on a lathe or grinder. The complete operation, taking about 10 min, restores worn parts at considerable saving over cost of new parts.

Pinion-End Protection



At the Paducah shops of the Illinois Central armature pinion ends are protected before dipping by eliminating taping and subsequent hand cleaning. Threads on inside of the 12-gauge sheet-metal can engage pinion threads. Flanged edges of can and spider are sealed.

Retainer Ring Tool

Scissors-like tool is used by Illinois Central to remove the snap retainer ring from main generator brush holders without burring and scratching the shaft. The tool head resembles two small wrenches with the open ends facing each other. Lugs at the spanner ends fit into the opening of the retainer ring. Pressure applied to the handles spreads the ring easily.

Speed and lack of damage to lining with nailer proved attractive for carbuilder.

Power Fastening Tools Speed Car Rebuilding

ᴦ.S. Army refrigerator cars are be- delivered overseas more rapidly ıuse automatic staplers and nailers being used. "Cutting the job in —at least—is only part of the of improvements which this pment is giving us," says J. A. ıll, executive vice president of the ıll Car Co. "No longer do we have aged wood due to misdirected mering, and now one man can do ob which used to take two."

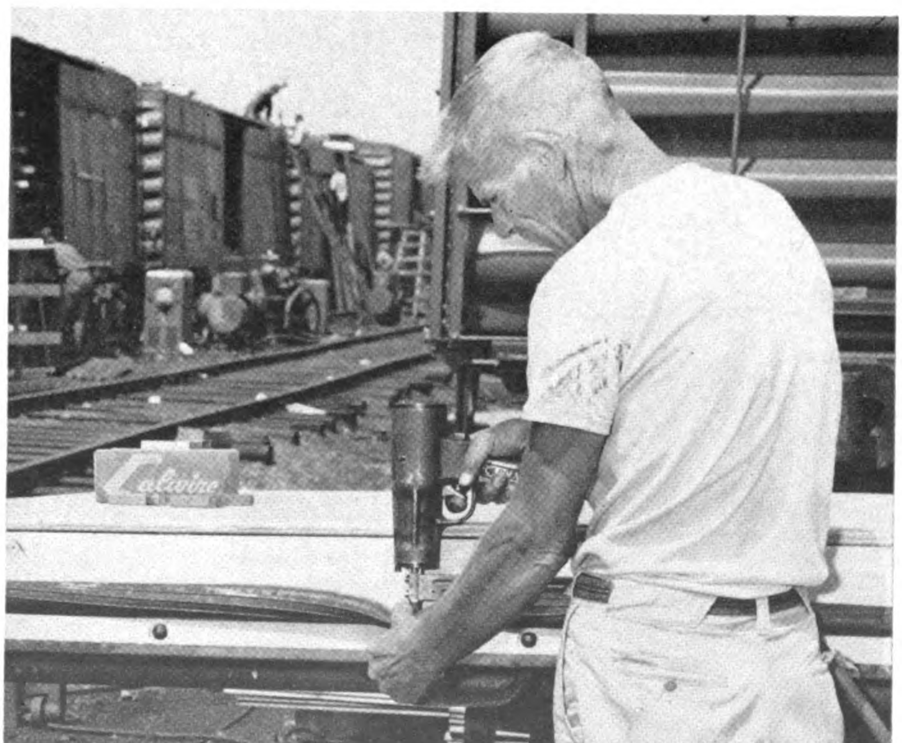
he U.S. Army contract calls for uction of ice-bunker refrigerator oad cars for use in Korea. This lves the rebuilding and conversion rmy box cars previously used in estic service. Thrall uses Bostitch ire air-powered equipment to e the rubber door gaskets in place o nail plywood sheets to the walls eilings of the cars.

pneumatic stapler, operating on 90 psi air pressure, is used to n the rubber gasket, driving 16- e wire staples which have ¾-in. ns and ¾-in. legs. The finger- ered stapler is light enough that it only one hand to hold and "fire," ing the operator to use his other for pulling back the edge of the er gasket so that the staples can iven cleanly and firmly. The job erly required two men, one using nmer and nails while the other the rubber gasket. The same man uses the stapler completes his on the railroad refrigerator car by nailing ¾-in. plywood sheets inside door wall with an auto- nailer.

nilar to the stapler in its porta- and simplicity of operation, the Bostitch nailer drives 2-in., .097 eter wire, acid-etched Calnails gh the plywood door lining sheets ut splintering. The 4- x 8-ft s are fastened to the door interi- ithout gouges in the wood. In- he car a nailer is used to fasten ood to walls and ceiling.

e operator can easily place the against the walls or ceiling to the 2-in. nails. The plywood s for wall lining, 4 x 8 ft, are ¾- ick. Ceiling is ½-in. plywood ed to 3- x 4-in. and 2- x 4-in. s. The automatic nailer is cap- of driving nails as fast as the op- can work.

ter the nails are sunk into the ply- , the surface is puttied. Varnish n applied to the walls, ceiling and to give a smooth interior finish.



Stapling proved economical substitute for nailing previously used in gasket application.

Coordinated Groups Set Programs

The four Coordinated Associations have announced completion of their program for the second week of the American Railway Progress Exposition in Chicago during October. The Exposition, scheduled to be open from Wednesday, October 9, through Wednesday, October 16, will be accompanied by simultaneous meetings of most of the trade, supply and shipper organizations in the railway industry. Among these groups is the AAR Mechanical Division which did hold a limited business session in late June but postponed its formal annual meeting until October 11. During this one-day meeting, there will be discussions of future trends and requirements both motive power and rolling stock (RL&C, July 1963, p. 3

The annual luncheon of the Coordinated Associatio is scheduled for Tuesday, October 15, with W. H. Kend president of the Louisville & Nashville, as speaker. N of the groups will have meetings during that afternoo order that all in attendance will have an opportunit visit the indoor exhibits at McCormick Place and the tr displays in the nearby Illinois Central 31st Street Ya All sessions of the four Coordinated organizations, wh programs appear below, will be held in McCormick Pl

Air Brake Association

J. H. Russell
President

J. B. Ball
Sec.-Treas.

Monday, October 14

Morning Session—10 a.m.

Address—President J. H. Russell, superintendent air brakes and steam heat equipment, New York Central.

Secretary's report.

Committee appointments.

Afternoon Session—2 p.m.

The Third Generation Brake Cylinder Release Valve—H. N. Sudduth, chief engineer, Railway and Pneumatic Equipment, Watertown Div., New York Air Brake Co.

The ABC-I Valve-Conversion Features—Pittsburgh Air Brake Club.

Better Brakes for Freight Cars—C. D. Wright, chief development and test engineer, Air Brake Div., Westinghouse Air Brake Co.

Automated Rail Operations—J. G. Cannon, manager, Commercial Engineering, Air Brake Div., Westinghouse Air Brake Co.

Tuesday, October 15

Morning Session— 9 a.m.

Air Brake Instructions for Repair Track—Manhattan Air Brake Club.

Election of officers.

A Reappraisal of Piston Tra Limits—Montreal Air Brake Club

Locomotive Air Compressor Sy chronization — Central Air Bra Club.

Air Compressor and Fan Dr Equipment — Dynapower Div., N York Air Brake Co.

Wednesday, October 16

Morning Session—9 a.m.

Performance of Gasket Material Sub-Zero Temperature—Adrien Bo air brake inspector, Quebec, Nor Shore & Labrador.

Time Saving Methods for Air Bra Maintenance — St. Louis Air Bra Club.

Question box.

Reports of committees.

Car Department Officers Association

C. W. Kimball
President

E. W. Gebhardt
Sec.-Treas.

Monday, October 14

Morning Session—10 a.m.

Address—President C. W. Kimball, chief of car inspection, Southern.

Report — AAR Loading Rules. Chairman: J. Peat, superintendent car department, Union Railroad.

Afternoon Session—2 p.m.

Report — Road-Rail Transportation. Chairman: C. R. Rabbeth, assistant superintendent, Louisville & Nashville.

Report—Interchange and Billing for Repairs to Cars, TOFC Trailers and Containers. Chairman: H. W. Watson, traveling car clerk, Santa Fe.

Report — Light Repair Track and Train-Yard Operation. Chairman: R. H. Bible, assistant manager, Coster Shop, Southern.

Tuesday, October 15

Morning Session—9 a.m.

Report — Freight and Passenge Car Equipment: (a) Design, Main nance and Upgrading of Freight-C Equipment. Chairman: A. B. Bjor master mechanic (car), Pittsburgh Lake Erie. (b) Passenger Car Maint nance. Chairman: G. L. Allen, ge eral passenger car inspector, Santa F

Report — Car Lubrication. Ch man: R. J. Chinn, mechanical an shop engineer, Illinois Central. Co ments—W. M. Keller, vice presiden Research Department, Association American Railroads.

Wednesday, October 16

Morning Session—9 a.m.

ꓤeport—Wheels, Axles and Wheel p Practices. Chairman: M. H. nmett, manager, Coster Shop, ıthern.

\ddress—M. S. Riegel, consulting engineer, Technical Committee, American Iron & Steel Institute.

Report—Maintenance and Servicing Mechanical Temperature Controlled Systems of Refrigerator Cars, Tanks, Containers, and TOFC Trailers. Chairman: R. L. Brittin, traveling inspector, Illinois Central.

Report—Painting. Chairman: W. H. Stinnett, foreman paint shop, Norfolk & Western.

Address—Francis Scofield, technical director, National Paint, Varnish & Lacquer Association.

Miscellaneous reports.

Election and installation of officers.

ocomotive Maintenance Officers Association

C. A. Love
President

C. M. Lipscomb
Sec.-Treas.

Monday, October 14

Morning Session—10 a.m.

Address — President C. A. Love, ief mechanical officer, Louisville & ıshville.

Afternoon Session—2 p.m.

Diesel Mechanical Maintenance — :her. Topic: Mechanical Mainte- .nce—Higher Horsepower Locomotives. Chairman: T. W. Bellhouse, superintendent mechanical department, St. Louis-Southwestern.

Diesel Electrical Maintenance. Topic: Effects of Higher Horsepower on Electrical Equipment. Chairman: J. R. Mitchell, assistant electrical engineer equipment, Illinois Central.

Fuel and Lube Oil. Topic: Fuel and Lube Oil Requirements for Higher Horsepower Locomotives. Chairman: C. A. Wilson, general supervisor diesel engines, Santa Fe.

Tuesday, October 15

Morning Session—9 a.m.

Diesel Engine Maintenance. Topic: Comparative Analysis of Higher Horsepower Maintenance. Chairman: G. W. Niemeyer, mechanical superintendent, Missouri Pacific.

Shop Equipment. Topic: Facilities Required for Higher Horsepower Locomotives. Chairman: J. D. Schroeder, assistant general superintendent motive power, Burlington.

Wednesday, October 16

Morning Session—9 a.m.

New Developments in Motive Power Maintenance. Topic: Mechanical Department Responsibility for Locomotive Maintenance Cost Control Systems. Chairman: W. F. Dadd, general superintendent motive power, Baltimore & Ohio.

Diesel Material Inventory and Control. Topic: Organization and Responsibility of Locomotive and Stores Departments. Chairman: G. R. Harrod, process engineer, Southern.

What Is Your Problem? Chairman: J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio.

ꓤailway Fuel and Operating Officers Association

L. H. Leikel
President

L. H. Peters
Sec.-Treas.

Monday, October 14

Morning Session—10 a.m.

Address—President L. H. Leikel, oad foreman of engines, Baltimore &)hio.

Report of secretary.

Address — C. E. Bertrand, vice ›resident, Baltimore & Ohio.

Afternoon Session—2 p.m.

Economical Distribution of Power —W. C. Copeland, general road foreman, New Haven.

Train Handling, incorporating: Freight Loss and Damage Prevention; Use of Radio; Draft Gears; Roller Bearings; Integral Trains. Chairman: A. M. Davis, chief road foreman, Delaware & Hudson. Co-chairmen: J. E. Hall, supervisor diesel operation, Chesapeake & Ohio; J. F. Litz, road foreman engines, Norfolk & Western.

Tuesday, October 15

Morning Session— 8:30 a.m.

Terminal Delays and Yard Operation, incorporating: Automatic Car Identification; Methods of Controlling Yard Costs; Hot Box Detectors; Wheel Checkers. Chairman: A. L. Abbey, road foreman of engines, Terminal Railroad Association of St. Louis. Co-chairmen: W. R. Foster, transportation superintendent, New York Central; A. C. Raborn, traveling engineer, Illinois Central.

Education and Training of Enginemen—C. E. Back, air brake and mechanical instructor, Pennsylvania.

Wednesday, October 16

Morning Session—9 a.m.

Diesel Failures and Steam Generator Troubles, incorporating: Passenger Train Operation during Extreme Winter Temperatures. Chairman: N. C. Sweetin, road foreman of equipment, Frisco; H. E. Warren, system general road foreman of engines, Southern; Charles Shipman, road supervisor motive power and air brakes, Union Pacific.

Official business.

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Liner Corrosion

What can be done to eliminate fretting corrosion at lower liner fit in cylinder blocks of Alco 251, Alco 539, and Baldwin 608 engines?

This is really crevice corrosion which may begin through the action of an oxygen concentration cell. Accumulation of corrosion products in stagnant areas may soon convert the cell to a more rapidly acting passive-active cell, after which corrosion could then proceed by a mechanism similar to that for pit growth. The water film between the liner and bore hole surfaces is certainly stagnant, under which conditions the usual cooling-water corrosion inhibitors are ineffective.

One railroad decided that, if this water film between the metal surfaces of the liner and bore hole could be eliminated, then no corrosion should take place in these particular areas. It was thought that this could be accomplished by completely filling this crevice between liner and block with a gum-type adhesive sealing compound such as Permatex No. 2 which is referred to as "compound."

If this sealing compound should get into the crankcase, the results would be nothing short of disastrous. This can be avoided, however, by caref[ully] following a few simple directions.

The following is suggested: Wh[en] applying liners to these engines,

1. Just before insertion of li[ner] into engine block, fill sealing-ri[ng] grooves at the bottom of the liner w[ith] sealing compound.

2. Snap seal rings into place, pr[ess]ing to firm seat against back of groo[ve] all the way around. This should for[ce] excess compound out of the grooves.

3. Spread excess compound ov[er] the exposed portions of seal rings [so] that it covers completely the area [of] liner in contact with bore hole of [en]gine block. Thus, there will be a co[n]tinuous band of sealing compou[nd] around the liner, which should exte[nd] from ¼ in. below lower seal ring [to] the following upper limits:

- Alco 539 engines—1 in. ab[ove] upper seal ring;
- Alco 251 engines—⅜ in. ab[ove] upper seal ring;
- Baldwin 608 engines—⅝ i[n.] above upper seal ring.

4. The area around the bottom [of] liner between the lower and upp[er] limits specified should be complete[ly] coated with compound. If the exce[ss]

ezed out of ring grooves is not :ient to coat the entire area, apply :ional compound.

Soap is not used in this appli- n. The compound provides the ;sary lubrication. However, after /ing, liner must be inserted into hole of engine block *before* the oound dries out and sets up.

After liners are applied, clean any excess compound shoved ıgh bore holes. This sealing com- ıd must *not* be allowed to get into kcase.

Compound is applied *only* to s. *Do not* apply to bore holes in ıe block under any circumstances.

When application is properly pleted, contact area between bot- of liner and engine block bore s will be filled completely and :d, so that no water can enter this k. If no water is present, then there ıld be no corrosion.

eorge W. Niemeyer, mechanical rintendent, Missouri Pacific.

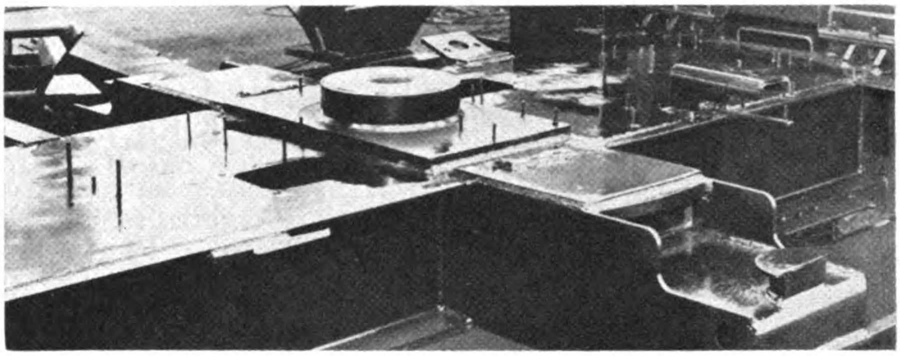
atched Injectors

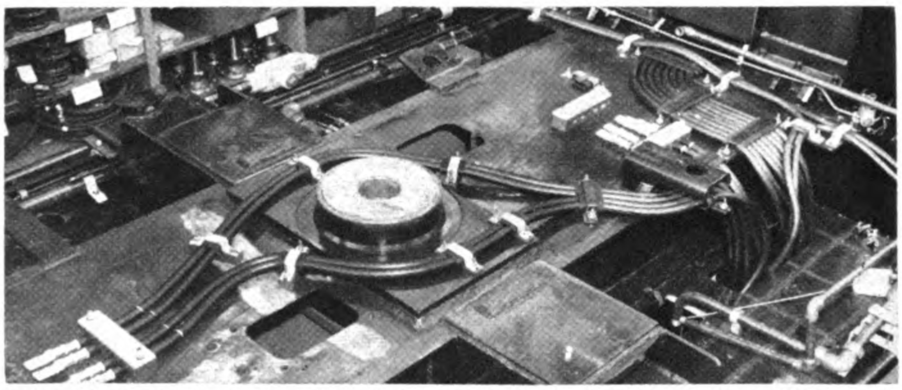
at are the latest techniques in l injection servicing and what he value of trying to match D injectors, basing this on de- ry of fuel for a given number trokes? Should these matched ectors then be kept in engine ?

The latest in fuel injection equipment is an adjustable fuel injector rack that replaces EMD No. 5226496. These are installed in the normal manner in the injectors l, after the injector is rebuilt and :ed, the injector is installed in an :tric-driven calibrating stand. The :ctor can then be adjusted to any ired output with no variation what- ver. Injectors are set for the C en- es at 400 cubic centimeters at 800 okes and rpm. This eliminates the :d to match injectors in different ssifications and to keep them in en- e sets, thereby eliminating a lot of ficulty and expense. It reduces pow- pack assembly maintenance and :ps exhaust stacks very clear.

K. Pruchnicki, supervisor locomo- e maintenance, Southern Pacific.

Weld Studs Simplify Locomotive Assembly





Weld studs ranging in size from ⅜ to ¾ in. are affixed to bottom of locomotive underframe and platform (upper). On these are mounted the clamps and brackets for securing the cables, wiring and piping (lower). GE reports a saving of 45% in this application.

Stud welding, frequently used in freight-car assembly, has helped to reduce some of the fastening costs involved in assembly of General Electric diesel-electric locomotives. GE's Locomotive and Car Equipment Department reports that it has been possible to cut fastening costs for certain components of the U25B locomotive by as much as 40 to 55%.

A total of 234 Nelson granular flux-filled studs, ranging in size from ¼ in. to ¾ in. in diameter and installed with Nelson stud-welding guns, are used to fasten various components in each of these locomotives.

The major application of end-welded studs on the U25B is their use on base angles for mounting the cab to the platform. This requires ⅝ x 3½-in. studs, with the 54 used per unit producing a cost saving of 55% over the previous method of drilling and tapping. In addition to saving production and assembly time, Nelson studs facilitate maintenance, reduce material handling, and improve appearance by eliminating bolt heads.

Studs welded to the bottom of the locomotive platform and to underframe members are used to suspend cable and piping. The pipe and cable clamps can be secured directly over the studs. Previously, hand welded tap blocks were used. The weld studs range in size from ⅜ to ¾ in. and effect a 45% saving.

To secure the mounting hatch or radiator side requires a total of 50 threaded studs per unit. A saving of 40% has been produced over the former method of drilling, tapping, welding a tap block, and bolting. A total of 35 collar studs are used to hold insulation and lagging on the cab roof. In this application, a 40% saving has been realized over the former method of spot welding stiffeners. The two remaining applications of stud welding are the securing of covers for the compressed air cleaners and on the number and headlight assembly where studs perform the function of securing the headlight. Savings of 50% and 40%, respectively, are credited to stud welding on these applications.

New Probl

This is the twenty-ninth inst of a series of questions and an on the Association of American roads Code of Rules Governing Condition of, and Repairs To, Fr and Passenger Cars for the Interch of Traffic which may help car clarify their understanding of the losophy, intent and requirement the Interchange Rules. The ans given to the questions are not considered interpretations of the R of Interchange, which can only rendered by the Arbitration Comm tee acting officially. The comm however, come from a backgrou intimate association with the app tion of the rules. The twenty-e installment appeared in the May is p 24.

When a loaded car offered in in change does not meet all of current requirements of Rule can the receiving road reject car and transfer its contents another car at the expense of delivering road? (308)

It depends on the particular Ru requirement which is involved some cases this expense is bil versus the delivering line, whi others it is not. See Interpreta No. 2 to Rule 3.

When renewing a metal brake s on a hopper or gondola car, i permissible to use any of the proved types as listed in Table Rule 101? (309)

No. Only the perforated-plate ty may be used on such cars beca they are better able to withstand effects of excessive vibration w shake-out devices are used to as in discharging ladings.

Is it now permissible to bill t owner for the expense of lig weighing and stenciling fore cars where such cars are weigh while in motion? (310)

Charge may be rendered in su cases if the weighing system us including scales and approach a leaving tracks, is properly desig for weighing in this manner and in charge of a competent weig master.

When building new cars, must

^AR Freight Car Interchange

terial and all parts used in their struction be new in order to perly classify them as new ts? (311)**

No. A limited number of second-hand components may be used, as isted in paragraph 1 of Section E of Rule 112, provided they meet he requirements for new cars as outlined in Rule 3.

t permissible to apply a second-nd axle which has gouges or ks in the body portion beyond in. in depth? (312).

No. Axles in this condition should be scrapped.

renewing defective angle cocks foreign cars on and after August 1963, can any type be used? 13)

No. Those applied must have the seal ring key.

it permissible to add state sales kes to bills for repairs to foreign rs? (314)

No. Suggestions to permit this practice have been investigated on various occasions and it has always been found that the additional work and the additional expense which would be involved in computing and reporting taxes as a separate item on car repair bills would not be justified by the amounts which would be recovered.

charge versus car owner permisble for the time involved in the ispection of multi-level auto icks prior to loading for the purose of determining whether all etails are in proper condition? 315)

No. The present rules do not provide for such a charge.

Vhen repairs are made to a rack, rame, or similar type equipment vhich is mounted on a railroad ar and is marked to indicate a eparate owner, should the repair ill be sent to this separate owner, r to the owner of the railroad car n which the auxiliary device is nounted? (316)

Car initials and number assigned and stenciled on car should govern the billing, and any further distribution of charges should be handled by the car owner.

What procedure should be followed where it becomes necessary to renew a defective composition brake shoe on a foreign car? (317)

If the handling line has no such brake shoes in stock, the car should be carefully examined to determine if it is equipped with a container which carries a set of replacement shoes as outlined in the note following paragraph (7) of Section (b) of Rule 3. If so, one of these shoes may be applied and bill for labor only rendered versus car owner per Item 2156 of Section B of Rule 101.

Personal Mention

R. E. Taylor
CB&Q

W. W. Simpson, Jr.
Southern

Burlington.—*Chicago:* R. E. TAYLOR, newly appointed chief mechanical officer (RL&C, July, p 46), entered Burlington service at Omaha in 1916 as a truck repairman. Subsequently, he was assistant general car inspector at Lincoln and Chicago; general car inspector at Lincoln; superintendent of Havelock shops; general car foreman, superintendent car department, mechanical engineer, mechanical assistant to vice-president, engineer of equipment, and general superintendent of motive power and equipment at Chicago. GLENN D. PORTLOCK, engineer shop methods and machinery, appointed assistant to chief mechanical officer.

Chesapeake & Ohio—Baltimore & Ohio.—*Baltimore, Md.:* Headquarters of K. T. REED, general manager—motive power and equipment, moved from Huntington, W.Va., to 2 North Charles St., Baltimore. *Huntington, W.Va.:* ROBERT P. CHAMBERS appointed electrical supervisor of diesels.

Erie-Lackawanna.—*Cleveland, Ohio:* GREGORY W. MAXWELL appointed vice-president of operations and maintenance. Mr. Maxwell formerly president of the Terminal Railroad Association of St. Louis.

Jersey Central.—*Jersey City, N.J.:* JACK A. CRADDOCK, general manager, elected vice president and general manager.

Missouri Pacific.—*Little Rock, Ark.:* C. H. CAVINEE named master mechanic, Louisiana division and Arkansas division (Little Rock to Texarkana, Gurdon to El Dorado, Bald Knob to Memphis), MP, and Union Railway, succeeding E. M. VANDIVER, retired.

New Haven.—*New Haven, Conn.:* W. B. CRAWLEY, electrical engineer, appointed mechanical engineer, succeeding W. E. SYMONS, now assistant manager purchases and stores. E. H. RANNEY appointed assistant mechanical engineer. W. A. RUSSELL, superintendent power plants and facilities, appointed manager-mechanical facilities. H. C. SCOVILL appointed engineer-electrical equipment.

Southern.—*Washington, D.C.:* FRANK S. WORTHINGTON appointed assistant vice president-operations. Mr. Worthington formerly resident vice-president at Chattanooga, Tenn. W. W. SIMPSON, JR., appointed director technological development. *Alexandria, Va.:* C. E. WEBB, engineer of tests, appointed engineer of tests, technological development. *Knoxville*

n.: PAUL C. SHU appointed general ıager, Western Lines. Mr. Shu formerly ͽral superintendent terminals, Atlantic st Line. L. S. PRESSON, JR., appointed ͽrintendent motive power, succeeding Simpson. *Spartanburg, S.C.:* JOHN ıSON, JR., appointed manager, Hayne ͽ, succeeding Mr. Presson. *Birming-ı, Ala.:* CLIFFORD A. JAY, JR., appointed ıter mechanic, succeeding Mr. Gerson. *ıtingburg, Ind.:* ROBERT R. RAY, JR., ointed master mechanic, succeeding Mr. *Columbia, S.C.:* WALTER R. JOHNSON ointed general foreman. *Hamburg, .:* LEWIS C. LAKE appointed general ːman.

ıhington Terminal. — *Washington, D.C.:* .BUR S. MORRIS appointed general fore-ı car department. Formerly foreman department, RF&P.

OBITUARY

ˈrank E. Molloy, who retired in 1959 as erintendent, mechanical department, ıthern Pacific, died suddenly in Sacra-nto, Cal., on July 16.

eport

(Continued from page 12)

H. Linder Nominated ı Head IEEE

H. Linder, Schenectady, N.Y., retired ɐ president of the General Electric Com-ıy, has been nominated as president of Institute of Electrical and Electronics gineers. The IEEE Board of Directors ıounced that his name would head a list nominees on a ballot of 1964 officers and ectors to be submitted to voting members er this year.

Mr. Linder is a former president of the ɑerican Institute of Electrical Engineers ıich merged with the Institute of Radio gineers in January to form the IEEE with vorld-wide membership of 150,000. Mr. ıder was active in merger negotiations d, presently, is on the Board of Directors IEEE. He also served as a treasurer and a director of AIEE.

One of the IEEE component groups is ː Land Transportation Committee whose imary interest has been rail transport. ɔrmally, in recent years, LTC has sched-ːd two meetings—one in conjunction with ː AIEE annual meeting in January and, e second, a Railroad Conference in co-ıeration with the American Society of echanical Engineers in April. C. M. ines, Westinghouse Air Brake Co., is cur-ntly chairman of the LTC.

lew Book

ˀrinciples of Penetrants," by Carl E. Betz, a source of information on the materials, ːchniques, equipment and uses of pene-ːants to detect cracks, leaks, porosity, and milar defects in metallic and non-metallic arts and materials. Technical data ranges ˈom a history of penetrants to the nature nd properties of penetrants and develop-rs, and uses of black light. *Published by Iagnaflux Corp., 7300 W. Lawrence ave., ˈhicago 31. Price $7.35.*

Supply Trade

OAKITE PRODUCTS, INC.—*Truce C. Zimmerman,* division manager, Dallas, Tex., transferred to Midwestern division at Kansas City, Mo., succeeding *Frank C. Weber* retired. *Griffin Tatum* of Montgomery, Ala., succeeds Mr. Zimmerman at Dallas. *Dennis O. Butterfield* named representative in Columbus, Ga., area.

GOULD-NATIONAL BATTERIES.—*N. R. Farsje,* vice president-director of automotive and general sales, elected vice president-director of sales for the corporation. *George P. Millington, Jr.,* general sales manager, Industrial Battery Division, elected vice president—sales, of the division, succeeding *J. R. Tench,* resigned. *R. W. Herbel* appointed district manager, Industrial Battery Division, Pittsburgh Region.

BRANDON EQUIPMENT CO.—*James G. Eliasek,* Richmond, Va., appointed representative, middle southeastern railroads.

BUDD CO.—*Edwin R. Wisner* appointed vice president, West Coast Transit Products, Railway Division. Mr. Wisner will establish an office in San Francisco and divide his time between that office and the Red Lion plant, Philadelphia. *Robert A. Lancaster,* manufacturer's representative, Railway Division, West Coast, will report to Mr. Wisner on all rapid transit matters.

PULLMAN INCORPORATED.—*W. Irving Osborne, Jr.,* president, designated chief executive officer, succeeding *Champ Carry,* who continues as chairman of the board.

COLORADO FUEL & IRON CORP.—*Andrew Lamberson* appointed railroad sales engineer, Denver, Colo.

STEADMAN INDUSTRIES LTD.—*Gabrial Alter* named president, succeeding *William D. Steadman,* resigned.

THOMAS A. EDISON INDUSTRIES, McGraw-Edison Co.—*A. W. Frank,* appointed to newly created position of manager of sales engineering. *W. E. Rowland,* field engineer, named eastern regional manager, Primary Battery Div., succeeding Mr. Frank.

OKONITE CO.—*Robert A. Stiles* appointed district representative in newly created Albuquerque, N.M., territory.

UNITED SPECIALTIES, INC.—Following named manufacturers representatives: *Ford-Lynch Associates (Frank Ford),* 1015 Chatthoochee Ave., N.W., Atlanta, Ga., covering Alabama, Florida, Georgia and Eastern Tennessee; *Paul Weiss,* Island Park, N.Y., covering Metropolitan New York City, Long Island and Eastern New York State.

SELLERS INJECTOR CORP.—Following companies named exclusive representatives in territories noted: *Cunningham Co.,* 239 Fourth ave., Pittsburgh, Pa.—Southwestern Pennsylvania and panhandle of West Virginia; *Scott & Stevens, Inc.,* 850 Richards St., Salt Lake City, Utah—Utah and Idaho; *H. H. Rugg Co.,* 2147 University ave., St.

ʌinn.—Minnesota, Northern Wiscon-
orth and South Dakota.

.EDUCTION SALES CO., A DIVISION
ι REDUCTION Co.—*Robert L. Stoecker*
ıted gas sales manager, Chicago sales
R. D. Switzer appointed gas sales
.er, Detroit sales zone.

:RAL ELECTRIC.—*R. A. Miller*
[manager of locomotive manufactur-
d engineering section, and *L. B. Close*
ıted manager of diesel engine project.

IOLDS METALS CO.—*Hal N. Logs-*
›pointed director of sales to transpor-
market, with headquarters in Rich-
Va.

› PRODUCTS, INC.—Additional of-
.cilities for Alco locomotive and en-
roducts division at Schenectady, N.Y.,
nclude a new three story wing on
ng 30 and the renovation of some
office facilities. Cost, $700,000.

O CORP. OF AMERICA.—*Richard*
:aney named manager, Railroad Prod-
Department, succeeding *W. P. Morri-*
Mr. Geaney formerly sales manager,
›ad Products.

ƽTEEL METALLURGICAL CORP.
ward S. Weil appointed sales manager,
ier-Capacitor division, succeeding
Laggi, resigned. Mr. Weil formerly
'est regional sales manager for the
on.

:BANKS, MORSE & CO.—Executive
s for Fairbanks-Morse, a subsidiary of
anks Whitney Corp., are included in
corporation offices at 1290 Avenue of
.mericas, New York 19.

PERS CO.—Koppers has acquired the
; of *Lamtex Industries, Inc.,* Farming-
N.Y., a pioneer in the development of
ilament winding process for manufac-
g glass-fiber reinforced plastics. Lam-
perations will continue at Farmingdale
Westbury, N.Y. The unit will be called
ıtex Industries of Koppers Co., Inc."

OBITUARY

HARLES E. BRINLEY, 85, former
dent and chairman of the board, Bald-
Locomotive Works, died July 7 at his
e in North Haven, Maine.

HOMAS C. FLEMING, who retired as
dent of the Wine Railway Appliance
in 1961, died June 30.

Trade Publications

(To obtain copies of publications, circle corresponding nu... on card following this page.)

47. ELECTRODE BOILERS. Application and operating ... on EBCO electrode boiler given in Bulletin A-2. Electric ... Corp. of America.

48. FASTENERS. Catalog (Form No. 132) describes type... styles, diameters and grip ranges of complete Huck Fa... System. Huck Manufacturing Co.

49. COMPRESSED AIR. Charts and data sheets, in fi... give information on the contents and effects of water, acid ... and other contaminants in compressed air. A simplified ... for purifying compressed air, without need for heat, po... regeneration, also described. Van Products Co.

50. BOILER WATER TREATMENT. Technical bulle... describes physical properties and uses of Dearborn form... to prevent sludge and scale in steam generator tubes and ... drums. Also lists dosage information and feeding and ... requirements. Dearborn Chemical Co.

51. COMPRESSED AIR DRYERS. Bulletin A-37-2R de... standard and high pressure units with capacities as high as ... cfm at 125 psi or 1,500 cfm at 3,000 psi. Contains also sc... diagrams, line drawings and tables for proper selection of ... Binks Manufacturing Co.

52. WELDING EQUIPMENT. "Aircomatic Welding E... ment," (Form ADC 717-I) presents a detailed description of ... comatic manual and automatic gas metal arc welding equip... Air Reduction Sales Co.

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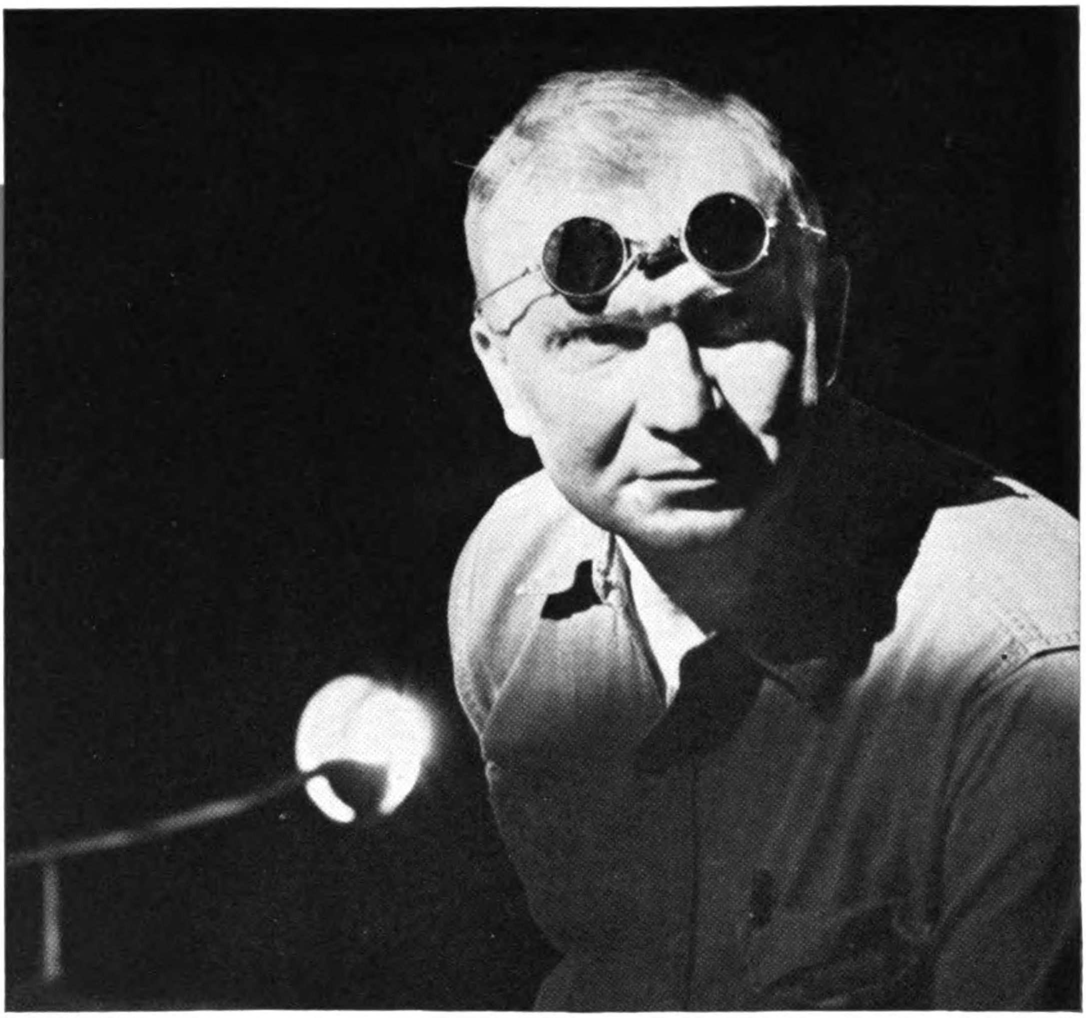

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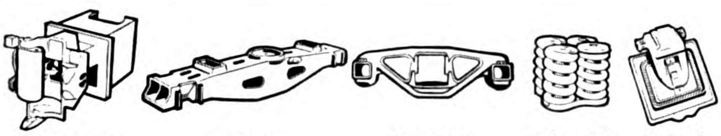

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SEPTEMBER 1963

Alco Announces Single-Engine Diesel-Electric With 2,750-hp Rating

...page 25

A Simmons-Boardman
TIME SAVER Publication

Step by Step Freight Car Progress Pays Off

Improvements in freight car design and constructio result in increased initial costs over old methods, bu pay off in the long run.

First came the automatic coupler. Then followed th air brake, allowing longer and faster trains. Later cam the integral box, cast steel truck side frame such a used under thousands of cars during the past thirt years, culminating in Buffalo's UNIT type which is no applied to nearly all new cars built. And now BRAKE-X offers the railroads the latest device to provide freigh car retardation while reducing undue wear on truc parts and costly upkeep. *Another major step forward*

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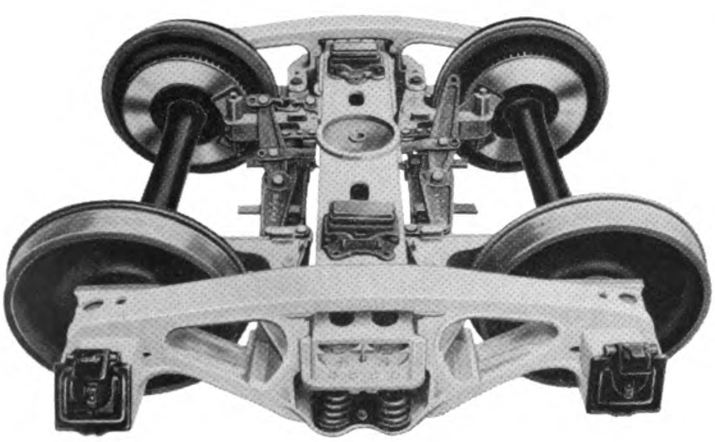
At the American Railway Progress Exposition, see Canadian National's Brake-X-equipped car 681009, which has completed close to 330,000 miles of continuous repair-free operation! On Display—Track Exhibit 4-N; Brake-X Truck, at Booth 5, McCormick Place.



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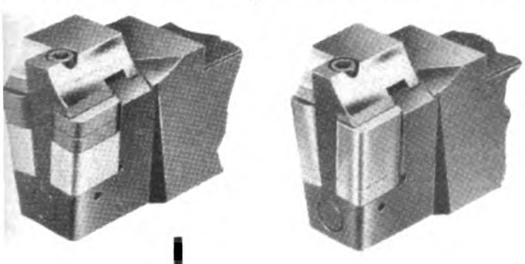

This tool for wheel turning uses either throw-away or regrindable inserts. LH and RH tools are identical except for the clamp. Change either or both inserts by loosening a single lock screw. Chipbreakers are also interchangeable. The conversion template for this tool allows the entire wheel OD including flange, side and top to be turned in one continuous operation . . . in less time.

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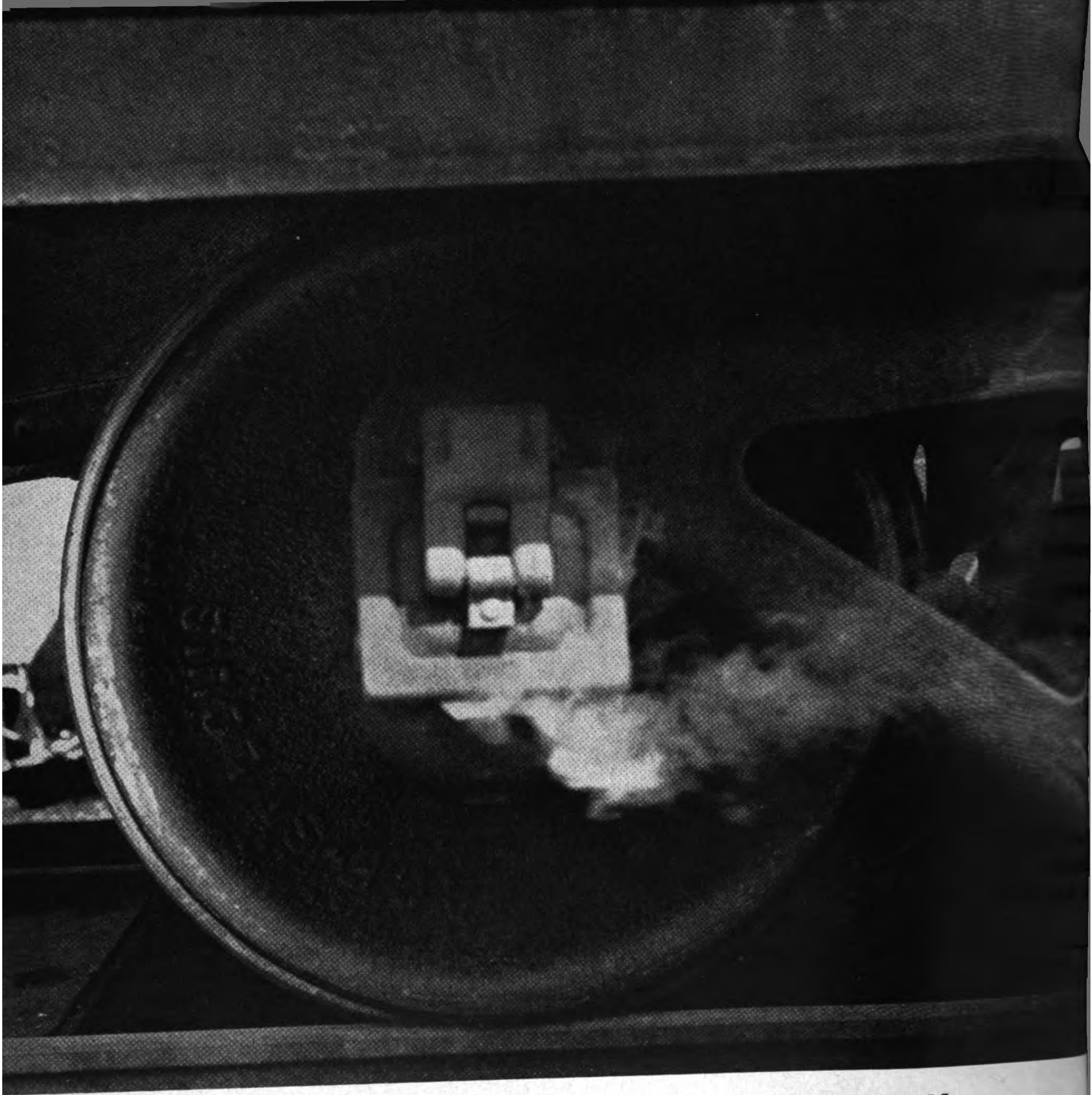

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America's Oldest Trade Paper
September, 1963—Vol. 137, No. 9

SAVING IDEAS FOR SEPTEMBER

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Report

ARP Exposition Will Be Big and Comprehensive

Over 300 exhibitors in McCormick Place and over 50 suppliers with outside displays in the nearby 31st Street Yard will combine to make next month's American Railway Progress Exposition in Chicago what is probably destined to be the largest and most comprehensive suppliers' show ever held for the railway industry. Equipment, tools and products for all railroad departments will be on display during the week-long Exposition, which will be open from Wednesday, October 9, through Wednesday, October 16. Locomotives, cars, rolling-stock components, and equipment for car and locomotive repair and servicing, however, will make up the major portions both of the indoor and outdoor exhibits. Exhibition space in McCormick Place will total more than 120,000 sq ft. Over a mile of track in the adjacent Illinois Central yard will be occupied by rolling stock and other pieces of equipment too large for indoor display. New high-horsepower locomotives, high-capacity cars, and equipment for piggybacking will be featured in the 31st Street Yard.

J. P. Kleinkort, chairman of the Combined Railway Suppliers Exhibit, has been coordinating activities of four supply groups which, normally, are responsible for exhibits held in conjunction with meetings of individual industry organizations.

One member of CRSE is the Railway Supply Association which, with its predecessors, has previously sponsored exhibitions coinciding with meetings of the AAR Mechanical Division and the Coordinated Associations. Other members of CRSE are the Association of Track and Structure Suppliers, National Railway Appliances Association, and Railway Signal and Communications Suppliers Association.

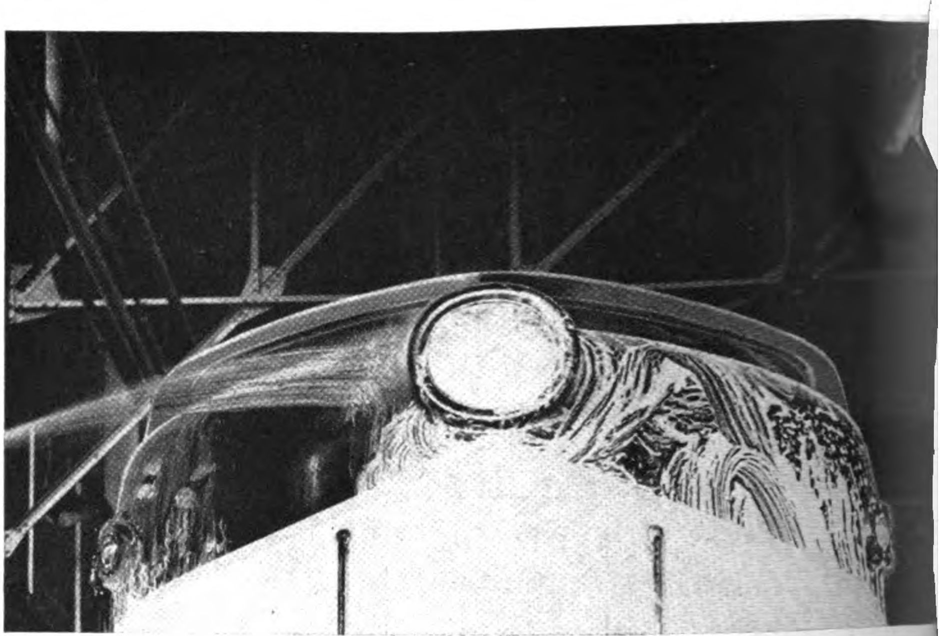
All equipment displays, and practically all meetings including all sessions of interest to mechanical department men, will be centered at McCormick Place, about two miles southeast of midtown Chicago, along Lake Michigan. Free bus service will be available between midtown hotels and the exhibition areas. McCormick Place contains several meal-service facilities, with capacity for serving the expected thousands attending the American Railway Progress Exposition.

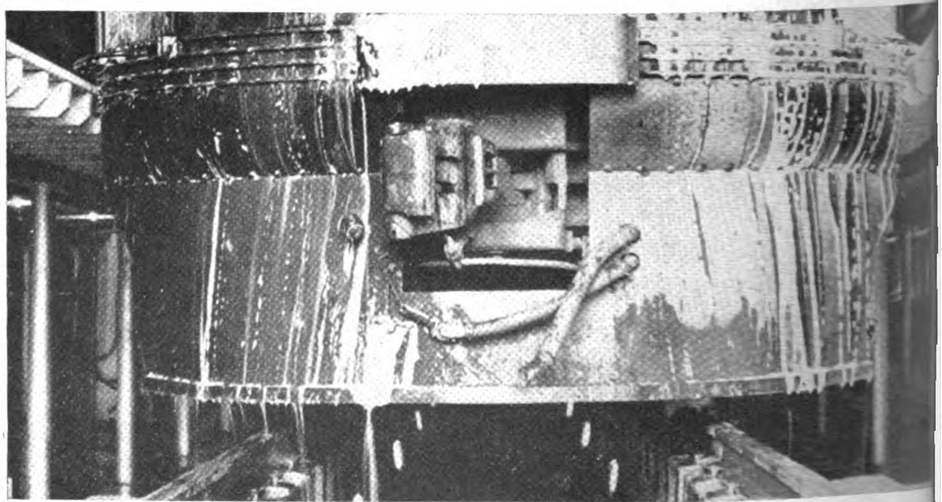
Even though no general meetings will be held there, the Hotel Morrison in midtown Chicago, at Clark and Madison street, will serve as convention headquarters for all mechanical-department organizations. The Morrison is one of the hotels from which regular bus service will be operated to the Lakefront area where McCormick Place is located.

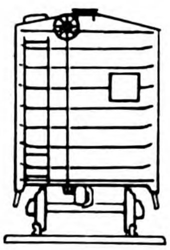
This year, meetings of practically all industry organizations will be held simultaneously with the Exposition. Among those scheduled are the annual meetings of the AAR Mechanical Division and the four Coordinated Associations, all of which will

(Continued on page 10)

Why are so many Railroads buying Oakite 202 *by the carload*?







That's easy! They're getting highest cleaning efficiency at lowest possible cost when they specify Oakite 202 the highly concentrated liquid detergent that can be cut better than 1 to 30 with water. That's not all! They're getting a cleaner that can be used practically anywhere. For example:

PASSENGER CAR INTERIORS. Here spongefuls of rich sudsy 202 solution quickly wash away soils from cane seats, plastic, curtains, shades, headliners, aluminum and stainless trim. Personnel like 202. It's pleasant to use and kind to the hands.

LOCOMOTIVE EXTERIORS. Here Oakite 202 used in pressure spray equipment does a tremendous job removing oil, road film, bug juice, soot film, light carbon. It rinses beautifully. Leaves no spotting, no streaking.

CAB INTERIORS, ENGINE ROOMS, SHOP FLOORS. Brush on Oakite 202 1 part to 30 parts water to remove light soils. For heavy soils and greases use Oakite 202 with 2 to 4 parts kerosene or fuel oil. OAKITE 202 is SAFE! Safe to people, kind to hands. Safe to paint, plastic, wood, decals, fabric. Flash point—NIL!

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SCIENCE

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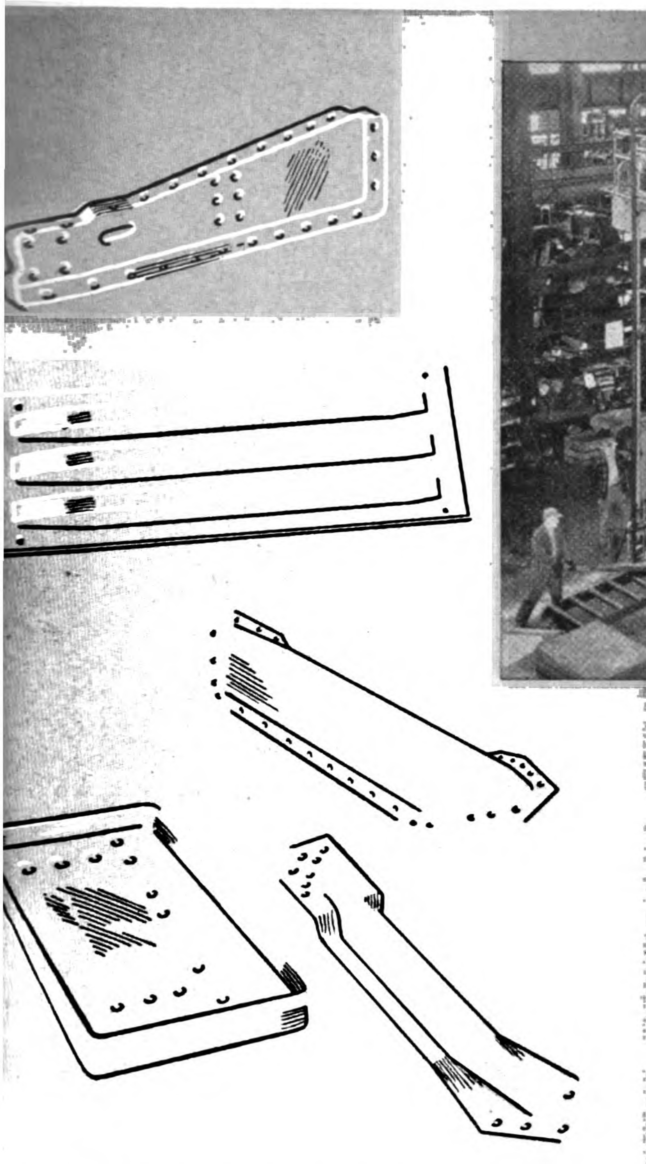
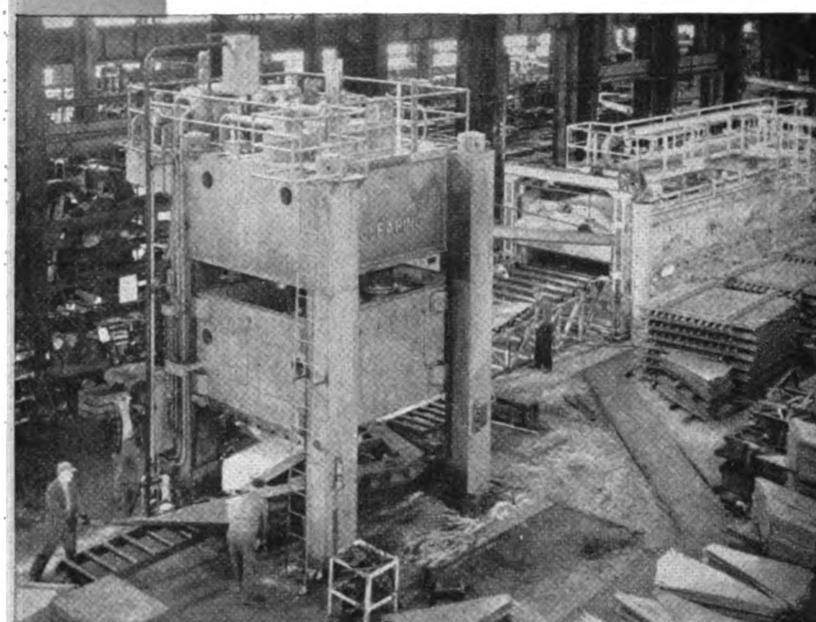




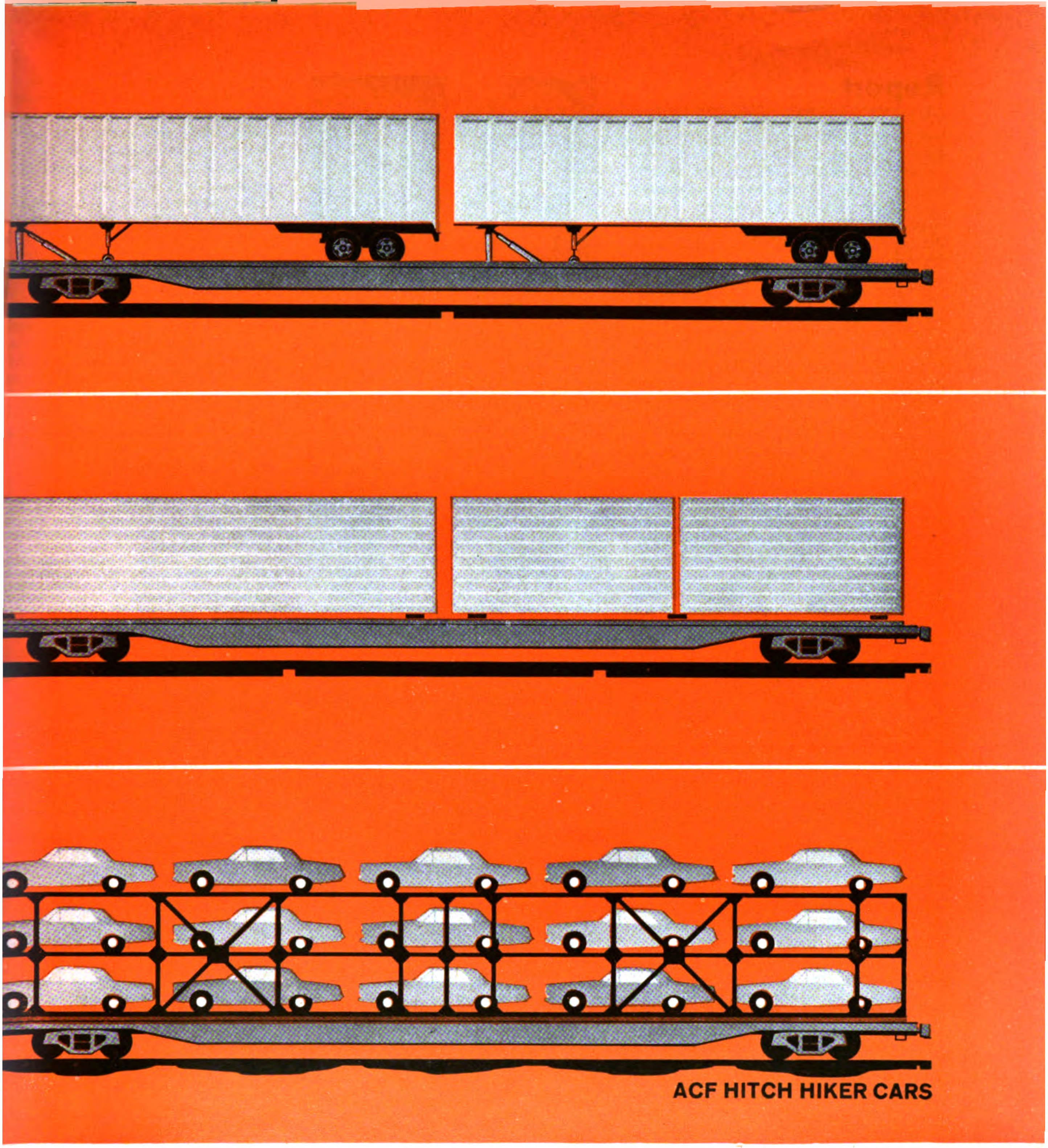
Big, modern equipment like this press permits accurate hot or cold forming of all freight car parts. As an example, this press forms ½" thick gondola ends. Greenville can furnish virtually all parts in any quantity—all accurate and ready for assembly. Be certain Greenville is included in your next request for bids. Delivery, prices and parts are "right" at Greenville.

GREENVILLE

STEEL CAR COMPANY

SUBSIDIARY OF PITTSBURGH FORGINGS COMPANY

GREENVILLE, PENNSYLVANIA



F Hitch Hiker cars serve all types of piggybacking

Cars equipped with ACF Hitches, or ready for auto racks, or set for container service are available in three sizes to meet your specific requirements: 89′ Low Level Hitch Hiker, the car that gives you ¾ of a foot more overhead clearance for full use of new larger trailers; 89′ Standard Level with 33″ wheel diameters that avoid excessive rail wear under heavy loads; and 85′ Standard Level, the industry pacesetter for years.

Unbroken ACF production, since 1958, has placed thousands of Hitch Hiker cars into reliable and profitable service for TOFC, auto rack and COFC use.

For full information on ACF piggyback equipment, please write Director—Marketing, American Car and Foundry Division, ACF Industries, Inc., 750 Third Ave., New York 17, New York.

AMERICAN CAR AND FOUNDRY
DIVISION
ACF INDUSTRIES

Report

(*Continued from page 5*)

be held in McCormick Place. June's limited annual business session of the Mechanical Division is being followed by the formal annual meeting of the Division scheduled for Friday, October 11. Earlier in that week, several of the Division's technical committees are scheduled to hold closed business sessions.

Because most of the formal business of the Mechanical Division, normally transacted during a three-day annual meeting in June, was conducted during a limited business session this year, the October 11th annual meeting will include three panel discussions and an address by A. E. Perlman, New York Central president. Chairman of the Mechanical Division is J. A. Welsch, general superintendent motive power, Illinois Central. Vice chairman is J. H. Heron, assistant vice president—equipment, New York Central.

The Mechanical Division annual meeting will open at 10 a.m. in the Lakeside Room with Mr. Perlman discussing Industrial Engineering in the Mechanical Department. This address will be followed by presentation of three topics vital to the design and maintenance of future rolling stock:

- The Ideal Design of Locomotive for Operation on the Average American Railroad—Representatives of all interested departments of the railroad industry, as well as those of the locomotive builders, will have an opportunity to set forth their opinions on the ideal locomotive from all viewpoints. This is to include the matter of maintenance which is of great importance to the mechanical departments and which, reportedly, is not always given consideration when new locomotives are being designed.
- Fundamentals of Car Design—The work of the Special AAR Task Force will be discussed. This current activity of the Mechanical Division, which is involving railroads, carbuilders and suppliers of freight-car components, was recently called by a railroad spokesman "one of the most significant things the AAR has ever done."
- Automation in the Railroad Industry, including Automatic and Semi-automatic Train Operations—Recent developments in Canada and abroad are expected to be discussed. It is also understood that a film taken by the railroad group which recenty visited the new high-speed Tokaido line of the Japanese National Railways will be shown.

Programs for the Coordinated Associations have been completed (RL&C, Aug. 1963, pages 46 and 47). These groups—the Air Brake Association, Car Department Officers Association, Locomotive Maintenance Officers Association, and Railway Fuel and Operating Officers Association—will first convene on Monday, October 14, and will hold additional sessions the following two days.

Following formal opening activities by each of the four organizations at 10 a.m. Monday, October 14, the groups will gather in the Arie Crown Theater at 11 a.m. for an address by a yet unnamed speaker. Meeting sites in McCormick Place, recently announced, are ABA—Room 10; CDOA—Room 12; LMOA—Banquet Room, and RF&OOA—Room 11.

A. E. Perlman

W. H. Kendall

None of the groups will meet on Tuesday afternoon, October 15, so that members may visit the exhibits. Speaker at the annual Coordinated Associations luncheon at noon Tuesday will be W. H. [illegible] president of the Louisville & Nashv[illegible] railroad has been active in int[illegible] freight equipment and motive pow[illegible] cent years and was one of the first o[illegible] of unit trains for rapid, economica[illegible] ments of bulk materials.

President of LMOA is C. A. Lo[illegible] mechanical officer, L&N. Chairma[illegible] Committee of the Coordinated Ass[illegible] is T. T. Blickle, general manager-m[illegible] cal, Santa Fe. Presidents of indivi[illegible] ganizations, in addition to Mr. [illegible] LMOA, are: ABA—J. H. Russel[illegible] intendent air brakes and steam hea[illegible] ment, NYC; CDOA—C. W. Kimba[illegible] of car inspection, Southern; and R[illegible] —L. H. Leikel, road foreman engine[illegible]

(TURN TO PAGE 59)

Orders and Inquiries for New Equipment

Placed Since Closing of August Issue

Locomotive Orders

ATLANTIC COAST LINE.—*Alco:* 4 2,750-hp, 6-motor, 6-axle Century 628 locomotives. *General Electric:* 4 2,500-hp, 6-motor, 6-axle U25C locomotives. *EMD:* 6 2,500-hp, 4-motor, 4-axle GP-35 locomotives.

CHESAPEAKE & OHIO.—*General Electric:* 38 2,500-hp U25B diesel-electric locomotives. To be operated in sets of four, primarily in heavy-duty coal haulage.

CHICAGO GREAT WESTERN.—*EMD:* 8 2,250-hp GP-30 diesel electric locomotives. Delivery to begin this month.

GULF, MOBILE & OHIO.—*EMD:* 10 GP-35 locomotives. For 1964 delivery.

READING.—*Alco:* 10 Century 424 2,400-hp diesel-electric locomotive for high-speed freight service. Cost, $1.7 million. Road will trade in obsolete 1,600-hp road freight locomotives from which main generators, traction motors and trucks will be salvaged and remanufactured for use on the Century units. For delivery starting in October.

Freight Car Orders

BALTIMORE & OHIO.—*Company shops:* 60 60-ft, 100-ton box cars equipped with cushion underframes for handling automobile parts; 150 50-ft, 70-ton box cars with cushion underframes; 150 50-ft, 70-ton box cars. Construction to begin early in November.

CANADIAN PACIFIC.—*Hawker Siddeley Canada:* 200 50-ton insulated box cars; 100 50-ton insulated box cars with load dividers.

CHESAPEAKE & OHIO.—*Company shops:* 2,000 hopper cars. Production to begin in November at rate of 32 cars per day.

CHICAGO & EASTERN ILLINOIS.—*Thrall:* 5 60¾-ft, 100-ton box cars equipped with cushion underframes, roller bearings and 16-ft doors.

CHICAGO GREAT WESTERN.—*General Steel Industries:* 10 70-ton bulkhead flat cars with roller bearings. For October delivery. *General American:* 12 Airslide covered hopper cars; 75 70-ton, cushion underframe box cars; 47 70-ton, insulated, cushion underframe box cars. *Pullman-Standard:* 30 4,000- cu ft covered hoppers. *ACF:* 3 flat cars equipped with bi-level racks. *Thrall:* 10 low-side gondolas; 5 covered gondolas; 5 cabooses.

ILLINOIS CENTRAL.—*Thrall:* 50 60¾-ft, 90-ton box cars equipped with cushion underframes, roller bearings and 16-ft doors. Estimated Cost, $1 million. For November delivery. *Company shops:* 350 double-door 50-ft, 70-ton box cars. Estimated cost, $3.5 million. For delivery this month.

KANSAS CITY SOUTHERN.—*General American:* Four 70-ton, 2,000-cu ft Airslide covered hopper cars; 2 50-ft, 70-ton insulated box cars. The six cars to be equipped with roller bearings. Hopper cars for delivery this month; box cars for fourth quarter delivery.

MONON.—*Pullman-Standard:* 50 100-ton, 4,000-cu ft covered hopper cars. Estimated cost, $700,-000. Six 90-ft, tri-level auto rack flat cars. Estimated cost $125,000. For Fall delivery.

NEW YORK CENTRAL.—*Pullman-Standard:* 98 70-ton Lo-Dek roller-bearing flat cars equipped with tri-level racks furnished by Whitehead & Kales. Cost, $2,170,000. For Merchants Despatch. Delivery to be completed next month.

NICKEL PLATE.—*Greenville Steel Car* [illegible] 100-ton box cars with cushion underfra[illegible] November delivery.

NORTHERN PACIFIC.—*Pullman-Standar*[illegible] 100-ton covered hopper cars equipped w[illegible] bearings. Cost, approx. $1.5 million. For [illegible] beginning in January.

PENNSYLVANIA.—*ACF:* 120 100-ton Cen[illegible] covered hopper cars equipped with roller [illegible] and 38-in. wheels. Cost, $1,641,000.

TRAILER TRAIN.—*ACF:* 150 89-ft pigg[illegible] cars equipped with FreightMaster cush[illegible] vices. For delivery this month.

Notes and Inquiries

Bethlehem Steel is now building piggyba[illegible] for wider trailers in anticipation of the [illegible] 8-ft 6-in. trailer widths are common. Te[illegible] side rails are used when 8-ft units are c[illegible]

The *Ontario Northland* is renovating [illegible] pieces of equipment at its North Bay [illegible] novation includes the widening of box-[illegible] openings from 6 to 8 ft.

The *Pennsylvania* has placed in servic[illegible] of 66 electric locomotives ordered from [illegible] Electric. First of the new 4,400-hp [illegible] delivered late in 1960 (RL&C, Dec. 1[illegible] with 60 using igitron rectifiers and six [illegible] with silicon rectifiers. One of the latter, [illegible] placed in service July 6, 1962, was the [illegible] first silicon-rectifier locomotive (RL&C [illegible] 1962, p 38). The new motive power re[illegible] outmoded 3,750-hp P-5 and P-5a frei[illegible] that went into operation when the Penn[illegible] electrified its New York-Washington an[illegible] York-Harrisburg, Pa., routes in the early [illegible]

The *Santa Fe* is inquiring for up to 1[illegible] ton, 4,200 to 4,500-cu ft covered hopper [illegible] grain haulage.

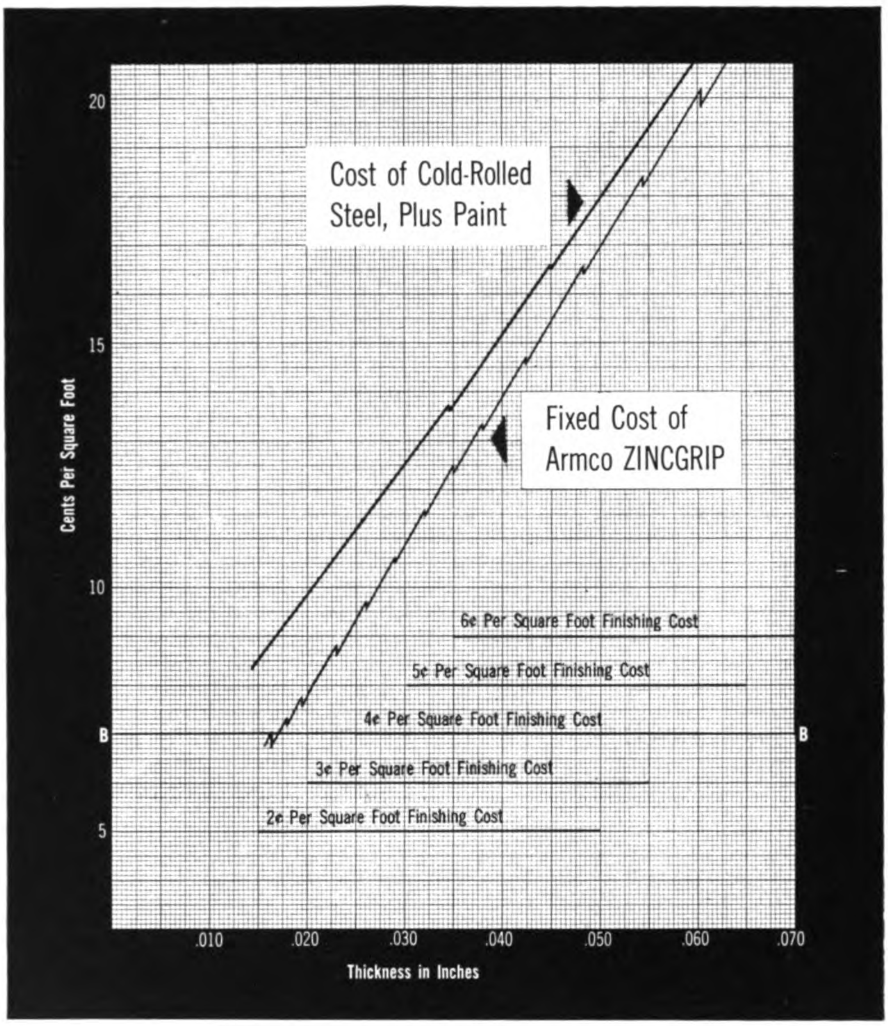
Trailer Train plans to acquire additional [illegible] back flat cars to bring its total fleet [illegible] units. Delivery of 204 89-ft Lo-Dek cars [illegible] Pullman-Standard and equipped with [illegible] Master cushioning devices is scheduled [illegible] this month.

Whitehead & Kales has entered the [illegible] for specialty car orders. E. S. Hebert, [illegible] announced that the Detroit builder [illegible] orders for more than 300 cars. W&K [illegible] some business with railroads since 1[illegible] recent years, has been a major supp[illegible] automobile racks applied to piggyback c[illegible] Hebert said the car-building move was [illegible] result of the rack business and the d[illegible] a "complete package."

Shop Facilities

The *Missouri Pacific* will rearrange [illegible] icing facilities and modernize the hea[illegible] in its Ewing Ave., St. Louis, shop (esti[illegible] $135,000); construct an automated whe[illegible] a centralized air brake shop at North L[illegible] Ark. $155,000); build car repair facilities [illegible] Neb., and McGehee, Ark. (estimated [illegible] 000); provide a cleaning and stripping [illegible] two-stall shot-blast shed, truck shop, [illegible] and wood mill at DeSoto, Mo. ($97,5[illegible] an inspection pit and relocate servicing [illegible] at Houston, Tex., Settegast diesel shop [illegible] and install gas-fired steam generators [illegible] trically operated air compressors at S[illegible] ($85,000).

"Finish Savings Finder" compares cost of Armco ZINCGRIP Steel with painted cold-rolled steel. Plastic overlay is movable to permit comparisons with various finishing costs.



ɔw to protect against corrosion—at less cost than painting

If you are painting concealed parts for corrosion resistance, it's likely you can save money by specifying these parts in Armco ZINCGRIP® Steel . . . and get better protection against corrosion as a bonus.

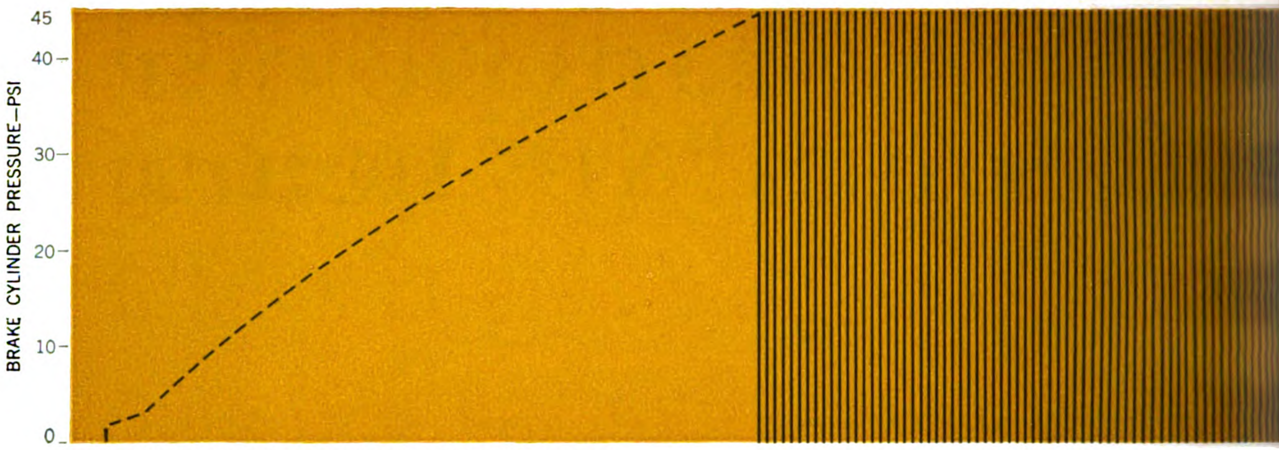
Value analysis engineers have found that Armco ZINCGRIP Steel generally costs less than cold-rolled steel plus the paint to cover it. In addition to probable savings on materials costs, this hot-dip zinc-coated steel saves the entire cost of applying the paint. Furthermore, by-passing the painting operation simplifies the flow of production, making further cost savings possible.

You can quickly estimate the savings on any part with our "Finish Savings Finder," shown above. The transparent overlay on this graph can be adjusted instantly to specific painting costs. For a free copy, just write **Armco Division, Armco Steel Corporation, Dept. A-2183, P. O. Box 600, Middletown, Ohio.**

Be sure to visit us at the Combined Railway Supplies Exhibit, Booth Nos. 1605-1611, McCormick Place, Chicago, Oct. 9-16.

ARMCO **Armco Division**


TIMKEN
TIMKEN
TIMKEN



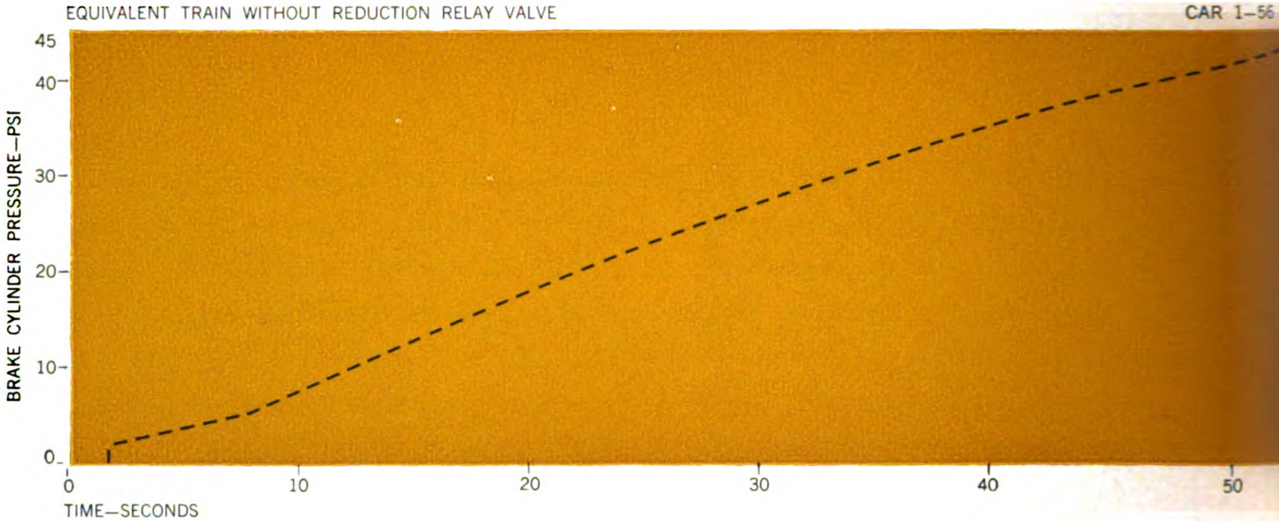
BRAKE APPLICATION TIME ON TRAIN OF SEVENTY-FIVE 100-FOOT CARS EQUIPPED WITH WABCO A-1 REDUCTION RELAY VALVE.

CAR 1–30 SECONDS

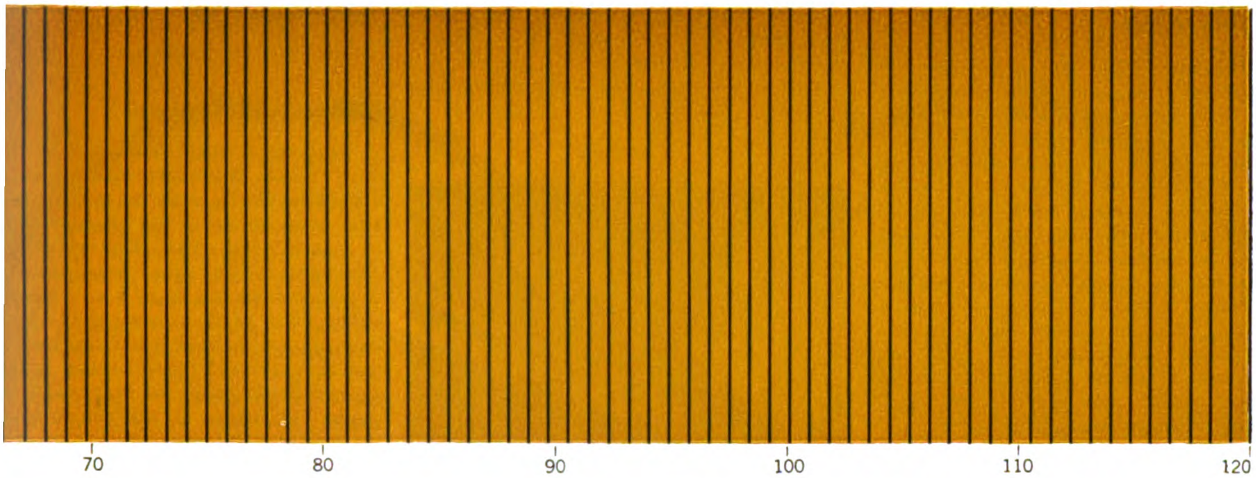
CAR 75–56 SE

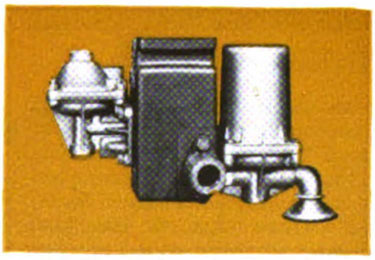
EQUIVALENT TRAIN WITHOUT REDUCTION RELAY VALVE

CAR 1–56 SE



)n today's long cars WABCO A-1 duction Relay Valves speed up ıke reaction time 50%-eliminate ɔcks, shorten stopping distance





:haracteristics of freight cars d on the volume of air for a ·foot car but because today's :ars (up to 100 feet) have ıately doubled the brake pipe their brake reaction time is . With the WABCO A-1 Reduction Relay olid or mixed trains of these long cars are faster and shocks originating in delayed are eliminated.

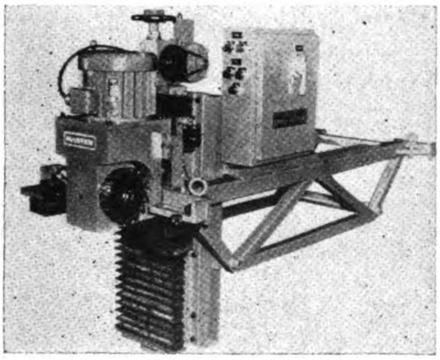
.BCO A-1 Reduction Relay Valve is designed de additional local venting on each car to sate for the increased brake pipe volume on s. Each valve is tuned so that long cars will ׀ same or better brake application time than ırs without interference with supplementary ke applications. The WABCO A-1 Reduction alve consists of a pipe bracket with a Quick Service Valve and a Vent Valve. Only one pipe connection is needed.

Service brake application is cut in half on seventy-five car train of 100-foot cars. With the WABCO A-1 Reduction Relay Valve, brake cylinder pressure (45 lb.) is developed on the seventy-fifth car in 56 seconds as compared to 120 seconds without. Brake cylinder pressure is also faster on the first car.

The Vent Valve amplifies local venting to compensate for additional brake pipe volume on long cars, insuring emergency transmission under all circumstances. Diaphragm operated, the A-1 Reduction Relay Valves are long wearing and need little maintenance. The diaphragms and "O" ring seals are easily replaceable without special skills. For complete information, write for Bulletin C.N. 1138.

WABCO WESTINGHOUSE AIR BRAKE DIVISION
WILMERDING, PA. / Westinghouse Air Brake Company

What's New in Equipment



Portable Miller

The Master precision milling machine can be lifted into place and either clamped or bolted to the locomotive chassis when repairing truck pedestal jaws. The machine incorporates a 7½-hp double-cutter milling head which can be power-fed vertically down between pedestal jaws. The cutters can be adjusted sideways 6 in. for varying pedestal jaw width. Electrical controls are contained in a convenient panel. Other features include positive lubrication of all moving parts, neoprene covers for protection of precision components from chips and dirt, standard NMTB spindles for use of standard cutters, and lift eyes for easy portability. Master Manufacturing Co.

For more information, circle 9-1 on card following page 60.

Insulating Tapes

Micarta Grade 5J51, one of two new Westinghouse tapes, is a flexible polyester-glass layer and wrapper insulating tape and fabric which is said to have excellent retention of dielectric strength at elevated temperatures. The Dacron warp and glass fiber filling threads are treated with a tan varnish having Class F properties. Tensile strength of 8-mil tape is 45 lb per inch in warp direction. Dielectric strength of 8-mil material is 2,100 V/M as received; 1,800 V/V with 6% elongation, and 1,400 V/M with 12% elongation. The fabric and tape are available in thicknesses of 8, 10 and 12 mils, in standard widths and 36-yd rolls.

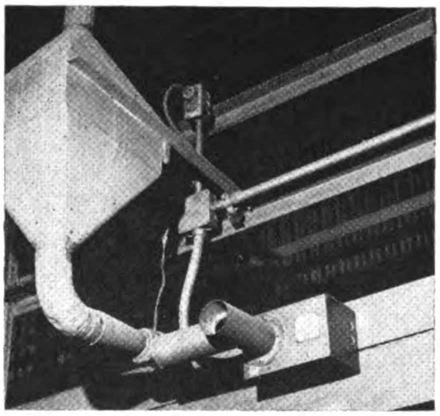
Dipping procedures are omitted and the time for production or repair of electrical apparatus is reduced, it is said, with Micarta Grade 5J60, an insulating tape with a thermoset adhesive coating on both sides. A Class F tan varnish is used. The Dacron-glass fabric used as a base is a straight-weave material. Electric strength is 10 kv after a 30-min cure at 135 C (no pressure). At 12% elongation, it is 8 kv. Before curing, the breakdown voltage is 9 kv. Tensile strength is 40 lb per inch width. The tape, available in standard tape widths, is 12 mils thick and weighs 0.625 lb per sq yd. Westinghouse Electric Corp.

For more information, circle 9-2 on card following page 60.

Carbon Remover

P-1753-A, a cold-tank carbon remover, solvent cleaner and paint stripper for railroad maintenance operations, is a clear, homogenous liquid which can be heated to temperatures of 150 deg F to soften and remove baked-on, hard carbon from pistons, connecting rods, bearings, or other engine parts. The liquid, it is said, will not corrode steel, aluminum alloys, copper lead, magnesium or its alloys. It has a flash point well above 150 deg F and complies with the corrosion requirements of MIL-C-25107. It is easily rinsed with water, steam or petroleum solvents; seldom requires dumping, and can be used with or without water seal. Wyandotte Chemicals Corp.

For more information, circle 9-3 on card following page 60.



Smoke Detector

An electronic smoke sentry, mounted high above the engine test bays in the diesel overhaul shops of the Southern at Atlanta, Ga., "keeps an electronic eye" on the smoke concentration in the air. When smoke density goes above a preset range, the Honeywell sentry automatically turns on exhaust fans to draw out the smoke. The installation uses a light at one end of the diesel test bay area focused on the sensor at the other end. When the light beam is dimmed by smoke, the sentry starts the exhaust fans. Sensitivity of the system is adjusted so that the fans are not turned on each time a diesel engine is started. A dust collector continually draws an air sample across the beam of light, keeping the glass face clean. An interlock in the circuit turns on additional heaters during the heating season so the fans don't pull out the heat along with the smoke. Minneapolis-Honeywell Regulator Co.

For more information, circle 9-4 on card following page 60.

Car Mover

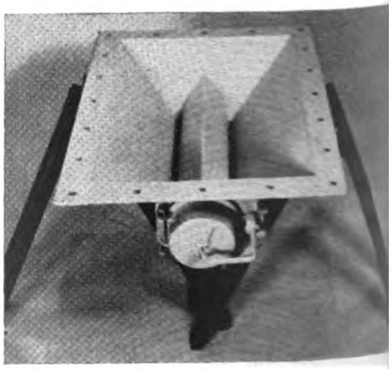
The Stamler hydraulic car mover, for use on spot rip or car cleaning tracks, has a variable and automatically adjustable stroke to fit any car length. It is mounted betw[een] the rails on the ties and secured to the [ties]. It consists of a frame with two trav[eling] barneys, each with a spring erected dog, propelled by a uni-directional hydra[ulic] cylinder. The mover unit complete with sled type power unit has a general pu[rpose] motor, hydraulic pump, oil reservoir, filters, relief valves and control panel. [The] power unit is located at any convenient [po]sition with hydraulic hose connecting integral parts, including the interlocked c[on]trol panel. In operation, the barneys [are] staggered so their strokes overlap. The [car] is carried a little more than half its len[gth] with dog contact on the axle or pad on [end] or side of car by action of one cylinder, then transferred to the action of the sec[ond] cylinder. The unit is covered for protect[ion] from weather except for the path of [the] traveling dog. W. R. Stamler Corp.

For more information, circle 9-5 on c[ard] following page 60.

Sinter-Seal Process

A tank liner which contains the impr[eg]nant within the Sinter-Seal process t[ank] eliminates the need for an outside reser[voir] and connections to the process tank. [The] process involves a liner, half full of a Sint[er-] Seal resin, or any other impregnant, wh[ich] is placed inside the tank. A wire basket co[n]taining the parts is suspended above [the] impregnant, the tank top closed and lock[ed] and air evacuated from the tank, simulta[ne]ously degassing both the impregnant and [the] parts. The basket is completely immer[sed] while under vacuum, and air pressure i[m]mediately returned to the tank. The p[arts] remain inundated under pressure, fr[om] atmospheric to 100 psig, for a period [of] time determined by size and pore struct[ure] of part. The air pressure is then reduced [to] atmospheric, the basket removed, allow[ed] to drip, and rinsed in solvent. The proc[ess] is said to be completed in less than 10 m[in]. National Sinter-Seal Div.

For more information, circle 9-6 on ca[rd] following page 60.

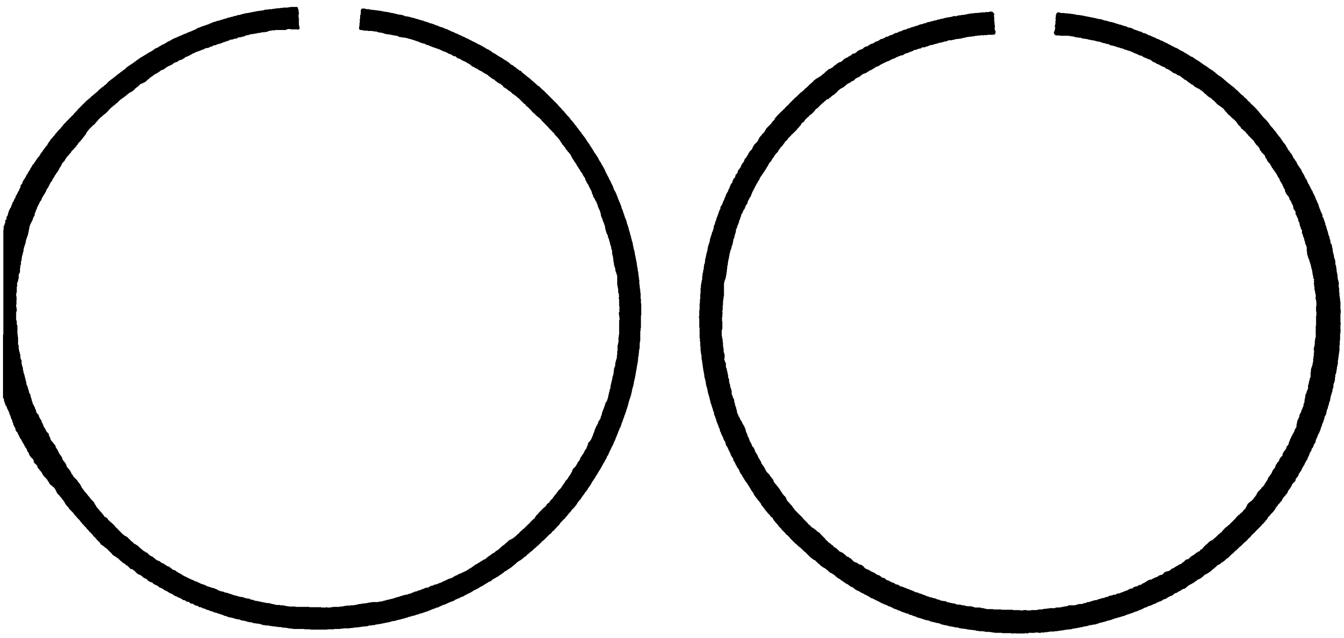


Unloading System

The Nacco-Matic device for pneumatica[l] unloading covered hopper cars is said t[o] cut unloading time by 33% in tests agains[t] similar devices now in use. The outlet ca[p] with latch is designed for hammer or b[...] operation. After the locking pin is lifted

(Continued on page 55)

how much do piston rings cost you?



$2.75... or $250.00?

The first ring, from ALCO, costs $2.75. The other—a "bargain"—can cost over $250.00 when you add up damage to the piston and liner, plus the labor required to repair them.

That's why first cost doesn't always indicate true cost when you're buying diesel renewal parts. Performance and reliability count, too. Bargain-priced parts that fail prematurely cost you more.

ALCO parts are always top quality, backed by a performance warranty and prompt, reliable service. ALCO's first responsibility is to its locomotive, so we don't try to cut corners by selling low-cost parts.

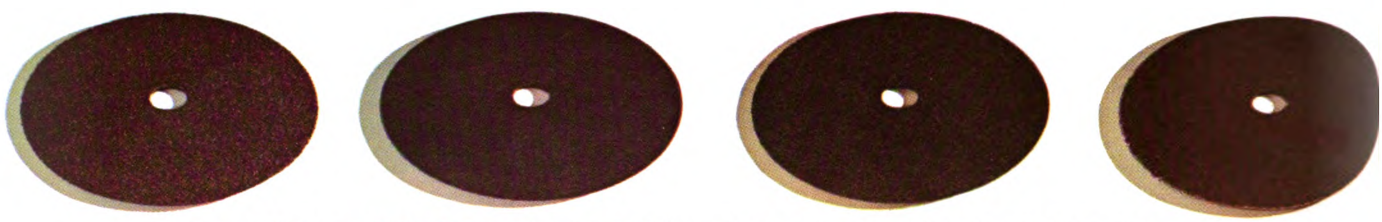
We're ready to serve you any time, with a complete line of parts stocked in strategically located warehouses. The next time you need renewal parts for your ALCO locomotives, contact your local ALCO representative. He's not selling bargains, but he'll save you money in the long run. ALCO PRODUCTS, INC.

PRODUCT QUALITY COMES FIRST

ALCO

ALCO RENEWAL PARTS REPRESENTATIVES: E. J. BROWN, Chicago, Ill. • T. E. FRYAR, Los Angeles, Calif. • J. H. CHANDLER, W. B. MEYL, N. Bergen, N. J. • C. HUTCHINSON, St. Louis, Mo. • J. P. SULLIVAN, Wash., D. C.

made for each other.....
Abrasives and tools..



THERE'S A SIOUX ABRASIVE DISC FOR EVERY NEED . . . .

INDUSTRIAL
Heavy-duty fibre backing; closed coat with extra grain and resin for severe grinding on heavy welds and rough work requiring maximum stock removal.

REGULAR
Medium fibre backing; closed coat for minimum grain loss. An extremely popular all-purpose disc for light welds and general grinding operations.

GRIND-A-LITE
Light fibre backing; grain distribution between closed and open coat; very flexible. Ideal for light gauge metals, contours and soft metals.

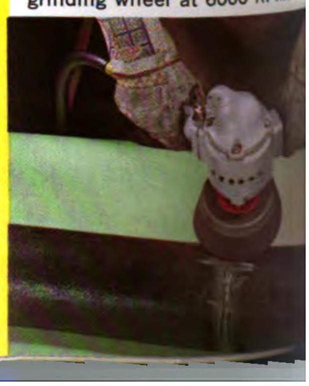
OPEN COAT
Heavy fibre backing with light grain distribution; strong bond for minimum grain loss. Use on paint, solder, aluminum, other soft metals . . . and for pre-finishing.

Powerful SIOUX 1270 Electric Grinder with 9" Kwik-Flat dresses down arc weld bead.

SIOUX 541 Horizontal Air Grinder with 8" wheel makes short work of heaviest grinding.

SIOUX 517 Horizontal Air Grinder gets into close quarters. 4500, 6000 or 9000 RPM.

Extra-heavy-duty SIOUX 532 Vertical Air Grinder turns 6" cup grinding wheel at 6000 RPM.



by SIOUX

SIOUX depressed center grinding wheels with built-in hubs save time and money!

SIOUX Kwik-Flat and Kwik-Cone

These new SIOUX grinding wheels have built-in ⅝" threaded hubs. To mount, simply spin them on the grinder shaft. That's all! Save the cost of back-up pads and cut mounting time to seconds. Made of the same durable aluminum oxide grain, backed and interlaced with fibre, as . . .

SIOUX Cool-Flat and Cool-Cone

Get fast stock removal plus long life with these two depressed center grinding wheels. Available in all popular grits, they'll handle heavy and extra-heavy work on steel, welds, wrought iron, stainless steel. Cool-Flat presents a flat grinding surface. Cool-Cone, dished out to a 15° angle, offers a more comfortable arm position . . . won't thin out.

Kwik-Flat

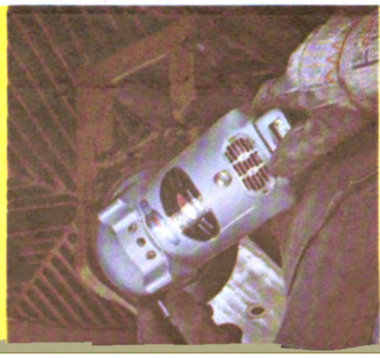
Kwik-Cone

Cool-Flat

Cool-Cone

SIOUX B504 Air Powered Wire Brush prepares heavy gauge sheet steel for painting.

SIOUX 1267 Electric Sander with 1.3 HP motor and 7" disc quickly sands prime coat.



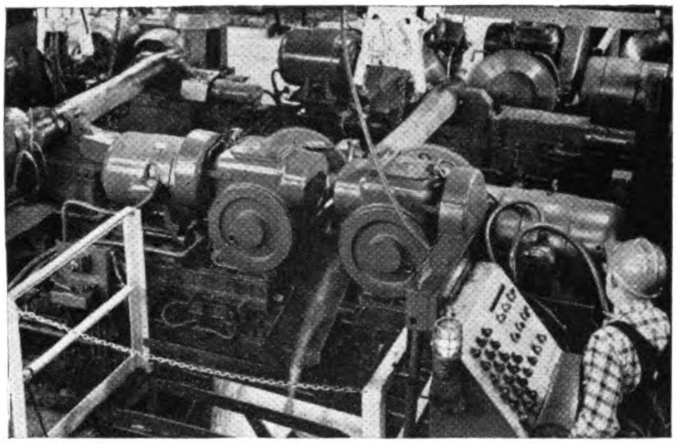
ASK FOR CATALOG 63

SIOUX

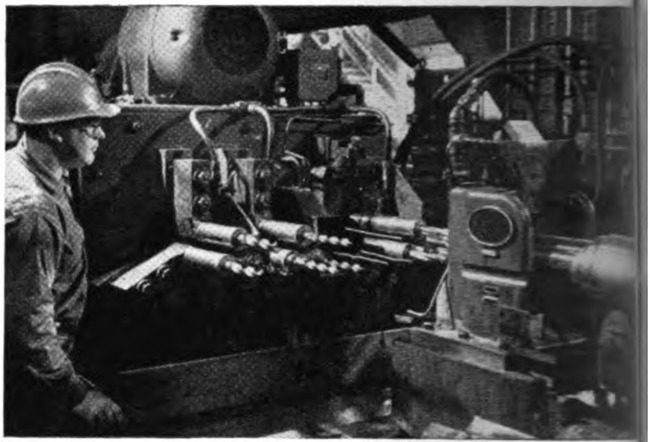
PORTABLE AIR, ELECTRIC TOOLS, ABRASIVES

ALBERTSON & CO., INC.

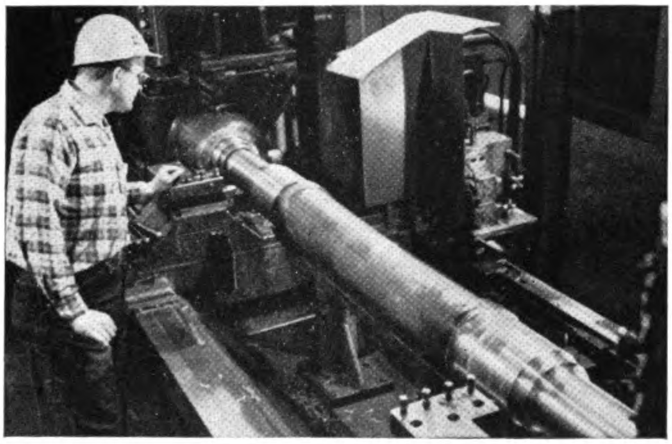
SIOUX CITY, IOWA, U.S.A.



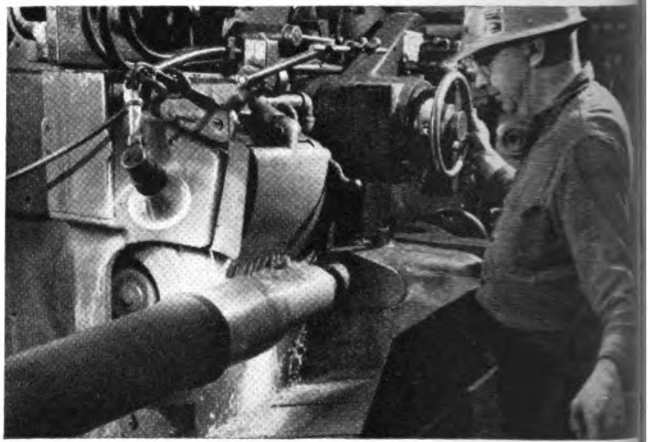
1. After the axle has been forged and straightened (and heat-treated, if desired), it enters the first machining operation. On this four-station, index-type automatic machine, we saw axles to length, mill the end faces, drill the centers.



2. Here, we drill and tap the roller-bearing end-cap holes in a four-station machine. The stations o 1) spot-drilling, 2) finish-drilling, 3) washout of holes, 4) tapping. Each operation is performed simultaneously on both ends.



3. On tracer-control dual-end drive lathes, we semi-finish-turn the journals and dust guards prior to grinding, and finish-machine the wheel seats.



4. Finish grinding is performed on contour grinders, to dimensions as established by the AAR. Each grinder is equipp with a wide wheel into which the exact contours of the axle journal and dust-guard seat have been dressed.

Here's why Bethlehem Roller-Bearing Axles are the best you can buy

Just look at the up-to-the-minute machining equipment in Bethlehem's Axle Plant—no one else in the country can match it; and no one else in the country has our depth of experienced personnel.

We can produce the two most popular roller-bearing axles in freight service: AAR Standard and AAR Alternate Standard. We also make roller-bearing axles for passenger cars and diesel locomotives, as well as solid-bearing axles for freight cars. We can finish-machine your axles more economically than anyone. What are your axle needs?

Steel

Steel for Strength

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Editorials

Aore Diesel Designs

New motive power to meet railroad requirements connues to come off the drafting boards and roll out of the lants of the locomotive builders. In this issue some details f the new Alco Century 628 model are given on Page 25. oo late to get in the issue is information released on ugust 28 on General Electric's U25C, a six-axle, sixiotor version of GE's 2,500-hp locomotive that heretore has only been available as the U25B, a four-axle, fouriotor unit.

Primary interest in the Alco Century 628, a six-axle, x-motor model, centers in the Alco 251-C engine that elivers 2,750 horsepower for traction. By internal engine ianges and by increasing engine rpm to 1,050, up 50 over ie 251 B's speed, the locomotive has 350 more horseower available for traction.

The GE U25C, to be described in our October issue, has tractive effort rating of 79,500 pounds. Other than using iree-axle trucks it is similar in most respects to the GE 25B.

The continuing developments in motive power show that ie locomotive builders, like the car builders, are designig equipment to serve traffic requirements. They also iow that the operating conditions in this country are so aried that no one locomotive design can economically rve all railroads and meet all requirements with equal iccess. What's good for one railroad is not necessarily ood for all railroads. The needs and the economies iange with terrain, climate and the amount and kind of affic.

The competitive new models announced this year also ill give the railroads an opportunity to make performance omparisons of comparable designs, whether it be with the opular 2,500 to 2,750-hp range locomotives or with the ig 5,000 to 5,500-hp units. Such competition is bound to nprove the railroads' own competitive position in the ansportation field by offering them a selection that would therwise not be possible.

ₑR Progress Exposition

The railroad convention and exhibits set for October -16 at Chicago will give railroad men an unusual opporinity to become better informed of their industry. So, if ou have not already done so, it's time that you talked to ie boss and made plans to attend the big show.

It will be the first time that so many railroad associations nd railway supply organizations have met in one continuus exposition. The Atlantic City conventions were sponored mainly by the Mechanical and the Purchases and tores Divisions of the AAR, and the exhibits were princially in the car and locomotive field. At Chicago next ionth all AAR divisions and all railroad departmental ssociations will be meeting. And the exhibits will be by suppliers serving all, including the mechanical, signalling and communications and track and structures departments.

The AAR Mechanical Division is holding a one-day meeting on Friday, October 11, with a half-day session on cars and the other half-day session on locomotives. It is confining its formal program to one day because a limited meeting was held in June to expedite the division's essential business. The October 11 sessions, however, promise to be of great value because both car and locomotive design will be under discussion by outstanding experts.

The Coordinated Associations will be meeting Monday, October 14 through Wednesday, October 16 with all four groups presenting full programs (See our August issue, p 46, for details).

So it's an unusual opportunity for railroad men because it will give them the privilege of broadening their knowledge of all aspects of railroading. We urge all to take advantage of the opportunity.

1964 Coordinated Meetings

Next year's meetings of the Coordinated Associations will be held at the usual time and place. They are scheduled for September 13-16, 1964, inclusive, at the Sherman House, Chicago. The group is composed of the Air Brake, Car Department Officers', Locomotive Maintenance Officers', and Railway Fuel and Operating Officers' associations.

We hope this information clears up some of the confusion about the meetings caused by the associations' participation in this year's American Railway Progress Exposition.

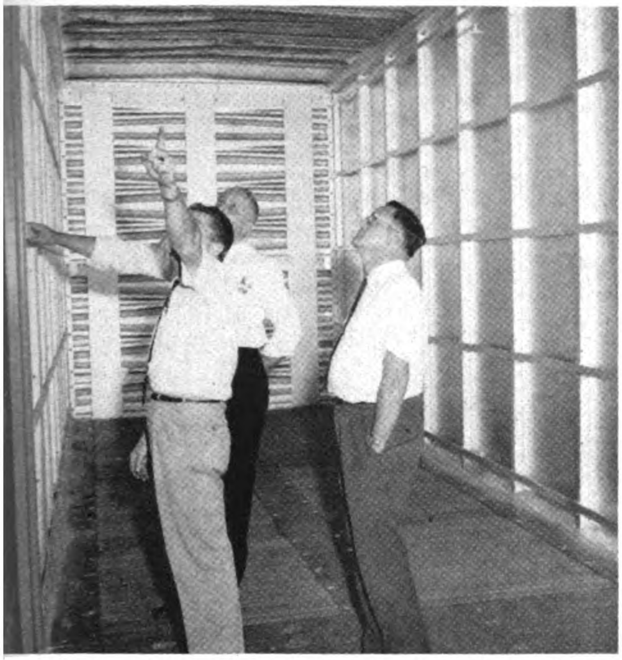
Timken's Millionth

The Timken Roller Bearing Company can be proud of its achievement in producing its millionth "AP" all-purpose railroad bearing.

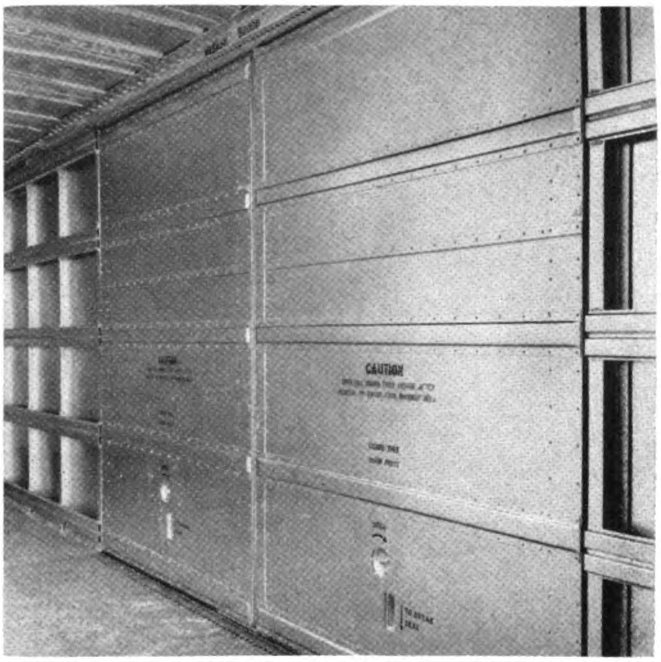
Back of the development of this freight-car bearing is a company's belief in the value of its product. As Timken's executive vice-president H. E. Markley said during the ceremonies on August 15 celebrating the event "we were willing to put our mony where our mouth is to prove that we could accomplish the result we said we could reach."

We believe that Timken's story of its "AP" bearing is an outstanding example of the persistance required to convince the railroads of a product's value. The railroads, with their necessary interchange requirements for freight cars, present a unique situation to the nation's manufacturers. Added to this complication is the railroads' reluctance to buy anything with a higher price tag unless it can be proved that the return on the investment is one that would make even bankers envious.

Timken's success in freight-car applications can be attributed to its resourcefulness in finding ways to lower costs. The all-purpose bearing design and the installation of automated production lines were big contributing factors in reaching this goal. They are largely responsible for the application of roller bearings to the majority of new freight cars.



ior of first car built by Greenville is inspected by DT&I mechanical . Absence of interior fittings is unusual in parts car.



Wide doorways are closed by newly designed double plug doors. Ability to operate them from inside was requested by customer.

'arts-Car Fleet Built in Record Time

Requirements of Ford are being met initially by Wabash and DT&I; Greenville and Thrall deliver the first cars

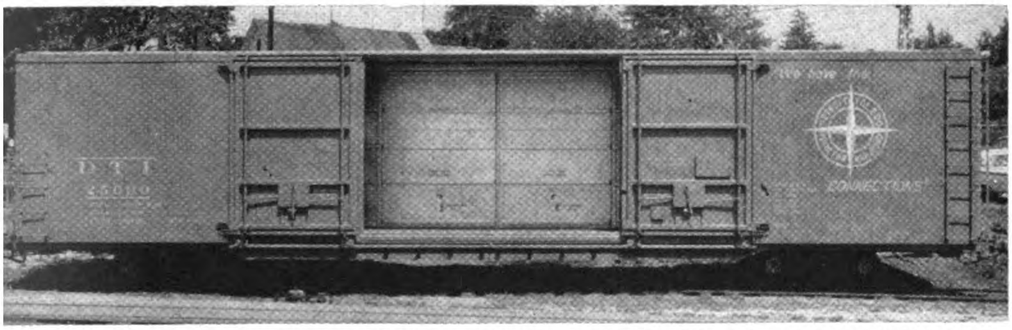
:arbuilders and railroads have co-rated to produce in record time ırge fleet of specialized box cars automobile-parts service. Produc-ı lines of three builders are cur-tly turning out cars for 25 railroads, two railroad shops will soon be ducing cars of the same general ign (RL&C, July 1963, p. 34).

nvolved are the 60-ft box cars ch Ford Motor Company re-sted those lines handling traffic ween its fabricating and assembly nts to put in service. These cars ıld make it possible for Ford to full advantage of rate revisions t the participating roads had put) effect.

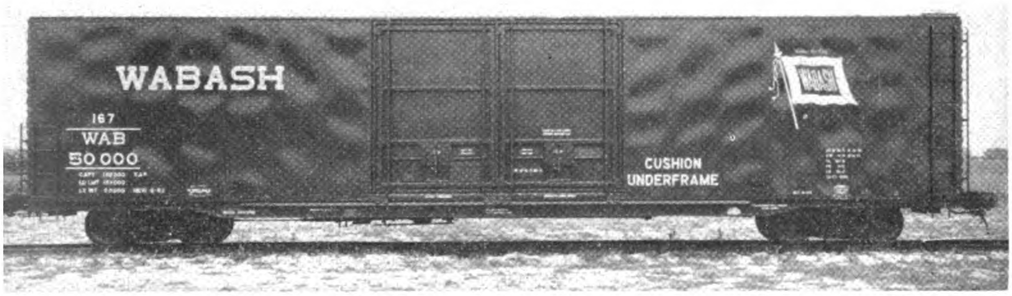
ord wanted cars of high-capacity 6,000-cu ft size to handle racks various types of heavy-density omobile components. All are to have cushion underframes. Greenville Steel Car and Thrall Car Manufacturing were the first to turn out the new cars. Since their initial models were delivered early last month, Pullman-Standard has begun production. The Santa Fe shop at Topeka, Kan., will soon complete the first of its home-built cars, and the Baltimore & Ohio shop at DuBois, Pa., will follow suit later this fall.

Greenville and Thrall have been working closely with the Detroit, Toledo & Ironton and the Wabash since spring when Ford requested a pool of approximately 2,500 cars. Because these two roads are originating carriers for a major portion of Ford's parts traffic, they were asked to take the initiative in getting the new pool in service. Timing of deliveries was most important in the meeting of production schedules for the many automobile and truck models represented in Ford's 1964 lines. Meetings were held in Detroit (DT&I) and in Decatur, Ill., (Wabash) with carbuilders. Basic details were outlined to enable them to proceed with designs which could meet the requirements. At the same time more than 20 other roads participating in the Ford traffic were asked to furnish varying numbers of duplicate cars.

DT&I and Wabash were to have 150 cars by September. To make this possible, the joint DT&I—Wabash order was split between Greenville and Thrall, and the two railroads worked closely with the two builders so that production would not be delayed. Thrall and Greenville cooperated at every stage from engineering through the ordering of component parts.



Capacity of Greenville-built DT&I car is 70 tons. Trucks are fitted with 6 x 11 flat-back bearings. All 50 cars have Keystone Shock Control hydraulic cushioning. Exteriors are painted Colorado green.



Wabash car built by Thrall has 90-ton capacity and is equipped with 6½ x 12-in. roller bearings. Doorways for double plug doors on cars for both roads are 16 ft wide, 10 ft 6 in. high.

Along with pooling their engineering ideas to fulfill the basic requirements, the two agreed generally on sizes of components and their suppliers. This close cooperation has produced a great deal of uniformity not only in DT&I and Wabash cars, but in cars of the other participating railroads which are to be built after those for the first two roads are completed. Standardized parts sizes have made it easy for suppliers to furnish ends, sides, roofs and doors rapidly.

First Greenville car for the DT&I was accepted at Greenville, Pa., on July 30. Thrall's first Wabash car was accepted at Chicago Heights, Ill., on August 6. Thrall has since been working on 75 Wabash cars which are to be completed shortly. At the same time, Greenville has been producing 75 cars—50 for DT&I and 25 for Wabash. Greenville orders from other roads include: Detroit & Toledo Shore Line, 12; Erie-Lackawanna, 25; Green Bay & Western, 10; Missouri Pacific, 125; New York Central, 85; Nickel Plate, 34; Norfolk & Western, 60.

Thrall orders from other roads: Baltimore & Ohio and Chesapeake & Ohio, 45; Chicago & Eastern Illinois, 5; Chicago & North Western, 25; Denver & Rio Grande Western, 31; Pennsylvania, 20; Rock Island, 10.

Pullman-Standard cars, which will be built at Bessemer, Ala., are for the following: Burlington, 50; Frisco, 25; Green Bay & Western, 2; Louisville & Nashville, 60; Milwaukee, 25; Cotton Belt, 5; Southern Pacific, 25; Union Pacific, 50; Western Pacific, 25. Santa Fe has started 100 of these cars through its shop and Baltimore & Ohio will build 60 later this year.

The cars will make it possible for Ford to abandon the traditional "code" system wherein the interior of each auto parts car is equipped to handle a specific component. The new cars are what Ford Director of Traffic E. S. Knutson calls "clean on the inside—plain box cars with no interior fittings." The parts as they are manufactured are placed in specially designed racks which are then loaded through the 16-ft doorways of the new cars by lift trucks. Car interiors are proportioned to make it possible for these racks to be stacked to within a few inches of the roofs. After fork-lift unloading at the assembly plant, the loaded racks are moved to the production lines where they are emptied as the parts are placed on new automobiles. Empty racks then go back into the cars for return to the fabricating plant.

The double plug doors being applied represent a cooperative effort of the railroads, carbuilders, Ford, and door manufacturers. Those of the first production cars are being fu Youngstown Steel Door.

"A standard design was ad says Youngstown's director o search, "to provide maximum my and reduce manufacturing time. The possibilities in stand dimensions are also great. Here i door that can be used with the ferent car constructions being t out by different builders. Only support cranks are varied to suit vidual car characteristics."

The double doors, which fi opening 16 ft wide and 10 ft 9 in. h are based on a relatively new sin sheathed concept where the con tional plug-door lining is elimina There is an external framing over door "skin" which itself lines up the carside. A prime requireme the design was incorporation o arrangement for opening of the d from inside the car. An entirely n mechanism was developed to eli nate the customary levers and sub tute a rotary lever to do the open and closing. With this design, a mec anism accessible from inside the do serves to break the seal and m the door outward under positive m chanical control. Only a 10-in. wren is needed.

In opening from the outside, t main door on the right is opera first. The sealing cam is raised u it rests against the door. The le is then rotated counterclockwise 1 turns, or until it will turn no m The door is then rolled back. Pro dure is repeated with left, or auxilia door. Using the wrench from insi the left (main) door is opened fi Wrench is first used on shaft in s housing and forced downward. W seal broken, wrench is applied upper shaft and rotated 1½ turn open the door.

All DT&I cars and part of the c in the Wabash order are being equi ped with Keystone Shock Con hydraulically cushioned underfra Remainder of the Wabash cars fitted with ACF Freight-Saver hydra lic cushioning. The Wabash cars h welded sides from International Ste Greenville fabricated the sides for t DT&I cars.

Roofs and ends for all cars w produced by Standard Railway Eq ment. Wood flooring in Wabash c is E. L. Bruce edge-grain Dura-Woo that in DT&I cars is Potlatch Elec Lam. Later cars are to have o types of steel and wood flooring.

ıry 268 is 69 ft over coupler pulling faces. Per cylinder rating of 2,750-hp engine is comparable with today's 12-cylinder, 2,000-hp model.

ɩlco To Build 2,750-Hp Units for ACL

he Atlantic Coast Line has just ɛred from Alco Products four of most powerful single-engine diesel-tric locomotives ever to be offered ɩe U.S. Prime mover for the newly gned locomotive will be a higher ɩepower version of the builder's :ylinder Model 251 diesel engine. oduction of the six-motor, 2,750-Century 628 locomotive marks the ɜt addition to the Alco Century ɜs of motive power (RL&C, March 3, p 31). Other locomotives in the tury series, announced previously, the 2,000-hp Century 420; the)0-hp Century 424, and the dual-ne 5,500-hp Century 855. The tury 628 is replacing the Century , the six-motor, 2,400-hp unit inally announced. None of these been built. To date, Alco has de-red only 420's and 424's.

'he 251-C diesel for the 628 is same as that to be used in the locomotives to be delivered to Union Pacific later this year L&C, July 1963, p 29). Traction sepower of the 251-C engine has n increased from 2,400 hp in the -B to 2,750-hp. The engine is an ɜnsion of the 251-B engine which been used in locomotives since ;5. P. N. Strobell, vice president l general manager of Alco's loco-tive and engine products division, d that "introduction of the higher-horsepower 16-cylinder 251 engine was preceded by five years of engineering design and development work, including laboratory testing at Schenectady."

The Century 628 will deliver its horsepower through six traction motors, one on each axle. The locomotive will be 69 ft long and approximately 15 ft high. It will weigh approximately 340,000 lb and have a fuel capacity of as high as 4,000 gal.

Standard gearing on the Century 628 is suitable for a nominal maximum speed of 70 mph. Either a steam generator or dynamic brake, or both, can be applied to the locomotive without altering the low-hood profile, the builder said. Mr. Strobell also pointed out that the purchase price of the Century 628 could be reduced up to 25% by the trade-in of older locomotives under Alco's "new power" program. He said that "251-powered Century locomotives will replace locomotives now in service with more powerful units capable of operating at less cost and with extended maintenance cycles, including a 96-month interval between major engine overhauls."

The 251-C 16-cylinder engine powering the Century 628 is a four-stroke-cycle engine of the vee type, with a 9-in. bore and a 10½-in. stroke. The turbosupercharged engine has two intake and two exhaust valves per cylinder, water-cooled cylinder liners and heads, and oil-cooled pistons. The engine is equipped with forged-steel connecting rods, a nine-bearing crankshaft, and a welded base and block.

According to the builder, the higher output of the 251-C engine was made possible through several internal engine changes. Engine speed has been raised from 1,000 to 1,050 rpm.

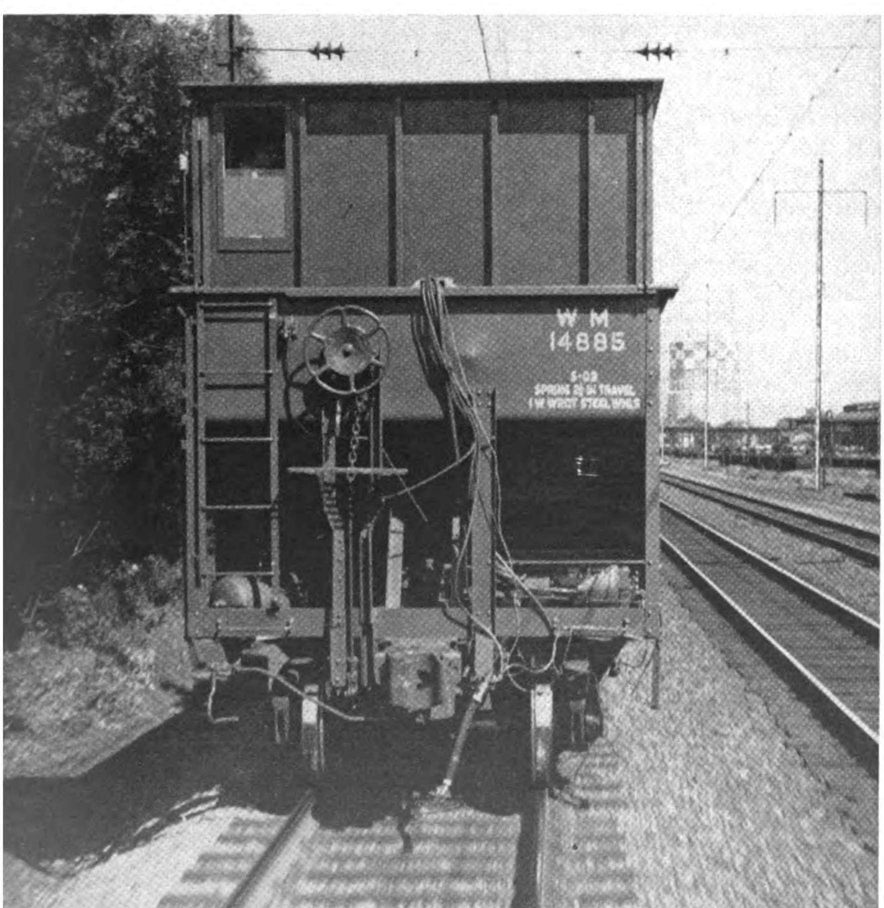
The engine is equipped with modified fuel pumps and nozzles. Fuel cams and rollers have increased widths to maintain moderate operating stresses. The crankshaft in the engine will be an eight-counterweight design which reduces inertial forces.

The 251-C is equipped with Alco's higher-capacity Model 800 turbosupercharger in conjunction with a single-pipe stainless-steel exhaust manifold and improved aftercooling with separate radiator cooling system.

Date for delivery of the first Century 628 to Coast Line has now been set for fourth quarter. When they go into service, the four units are expected to be subjected to extensive testing and evaluation. In addition to its new high-horsepower Alco units, ACL has ordered from the other two domestic locomotive builders groups of their 2,500-hp single-engine diesel electrics (see page 10).

lectric locomotive accelerated test car to predetermined speed; was then uncoupled and pulled away. Car was braked at desired rate.

Iron, Composition Shoes Compared



istrument "doghouse" atop WM car contained recording devices and equipment for operating rake system. More than 700 tests, with one and two cars, were run during 5-week period.

A comprehensive road-test program on brake shoes involving over 700 tests has been completed by Westinghouse Air Brake Division of Westinghouse Air Brake Company. Test runs made over a 5-week period included stop distance tests from speeds up to 74 mph, simulated grade tests, and hand-brake tests using open-top hopper cars having cast-iron and Cobra composition brake shoes. In addition to brake-shoe tests, the Wabcopac brake assembly which employs Cobra shoes also underwent extensive testing.

Tests, run on the main line of the Pennsylvania, just east of Harrisburg, Pa., were planned to develop information not previously available. Three Western Maryland 50-ton, twin-hopper cars and three Reading 100-ton triple-hopper cars were used. The three WM cars, which had an average light weight of 43,000 lb and an average loaded weight of 173,000 lb, were equipped with 33-in. one-wear wrought-steel wheels. Originally, the WM cars were equipped with conventional brake rigging and cast-iron shoes. One was converted to Cobra brake shoes by redrilling the brake levers to reduce the brake application force. The second car was equipped

ith the B-3 7 ½-in. Wabcopac brake sembly. No changes were made in ird car.

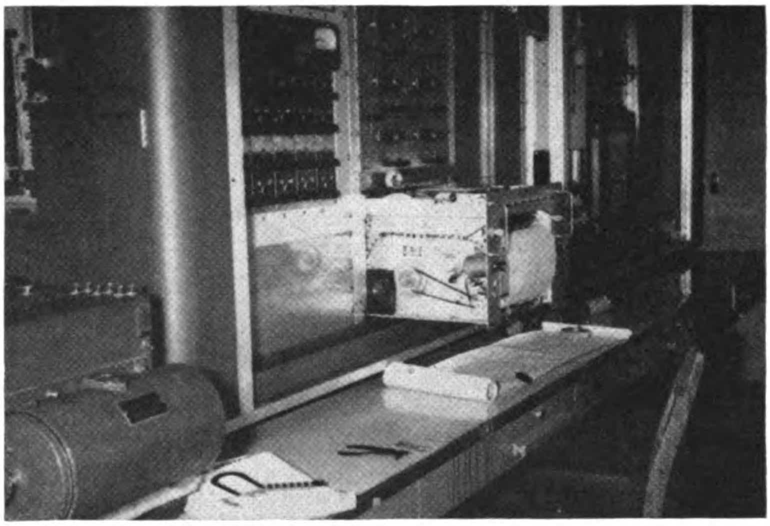
The three Reading cars, averaging ,000 lb light and 251,000 lb loaded, ere equipped with 36-in. multiple-ear CR steel wheels. Originally, they d conventional rigging and Cobra ake shoes. One car was converted cast-iron shoes; increased braking wer was provided by a change of ers. A second car was equipped th the B-3 8½-in. Wabcopac brake sembly. The third car remained un-anged.

Enclosed platforms were built un-r the slope sheets at both ends of the Reading cars to house test crew and test instruments. A "doghouse" was built on top and at one end of each of the WM cars for the same purpose.

The test train consisted of a PRR 4,620-hp GG-1 electric locomotive, two cabooses and the test car or cars. One caboose was used by the test crew and one by observers. Tests were run on individual hopper cars, both empty and loaded, using emergency and various degrees of service braking. Two coupled cars were braked to determine performance of combinations of 50- and 100-ton cars having Cobra composition and cast-iron shoes. Simulated grade tests were made by dragging each partially braked car for 45 min at 20 mph. Breakaway tests, in which free-rolling cars were braked from various speeds, were facilitated by the rapid acceleration of the GG-1 locomotive.

Data is now being collated preparatory to submission to the various groups for approval. Observers at the tests included members of the AAR Mechanical Division's Brakes and Brake Equipment Committee, AAR Research Center, test department representatives of the PRR, and representatives of 20 railroads of the U.S. and Canada. Results of this research are expected to be available soon.

CN Research Car Gives Equipment Designers More Road Test Data



Instrument rack within car carries variety of research tools. Six-channel Brush recorder has been rolled out for removal. Living quarters are available for crew of test engineers; car has its own heat and lighting.

Design and maintenance of Canadian National cars and car components can now be investigated using a test car put into service recently by the CN research organization. The car is also instrumented to study many other physical problems encountered in rail transportation. Capable of measuring force, acceleration, velocity, displacement, strain and temperature, the car has already been used to determine track surface roughness under the dynamic wheel loads of a loaded freight car.

The car was converted from a 34-year-old buffet lounge car by fitting it with electronic instruments for making and recording measurements. Measuring equipment includes a 12-channel oscillograph, strain-gauge carrier amplifier, speedometer, mileage indicator and 14-channel, 6-channel and 4-channel tape recorders. Provision has also been made for installing an analog computer which is used for processing data as received or for carrying out the double integrations of acceleration values which will produce displacement measurements.

Data, as received, can be recorded on chart paper for visual monitoring and analysis. When necessary, because of the complexity or volume, data may be recorded on magnetic tape for subsequent analysis by analog-computer methods. Generating and heating equipment are installed so the car may operate in freight trains or may be placed on sidings where no heat or electrical facilities are available. The car has living quarters for the crew of engineers and technicians who operate it on test runs. It can be placed anywhere in freight trains so that dynamic tests of rolling stock may be carried out under actual operating conditions.

In addition to measurements of track-surface roughness, the car has already measured rail stresses generated by trains passing over welded rail laid on concrete ties, and recorded yard impact tests on new and modified freight cars. Future programs will measure bearing loads, and the effects of various types of rail and ballast on ride of freight cars. Comparative tests and measurements of impacts and stresses in cars operating in freight trains can also be made with this rolling laboratory.

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for superior quality rings

The Gould Engine Parts line of superior products includes Pedrick Piston Rings — known for truly outstanding performance from coast to coast for many years. Pedrick rings are renowned for dependability in all Diesel applications.

To be sure of better and longer performance, insist upon Gould Engine Parts. They are products of one of the nation's largest basic manufacturers of heavy-duty and specialized engine parts. For the widest range of piston ring designs and sizes, in open stock or engineered sets, look for the name Pedrick, a product of Gould Engine Parts.

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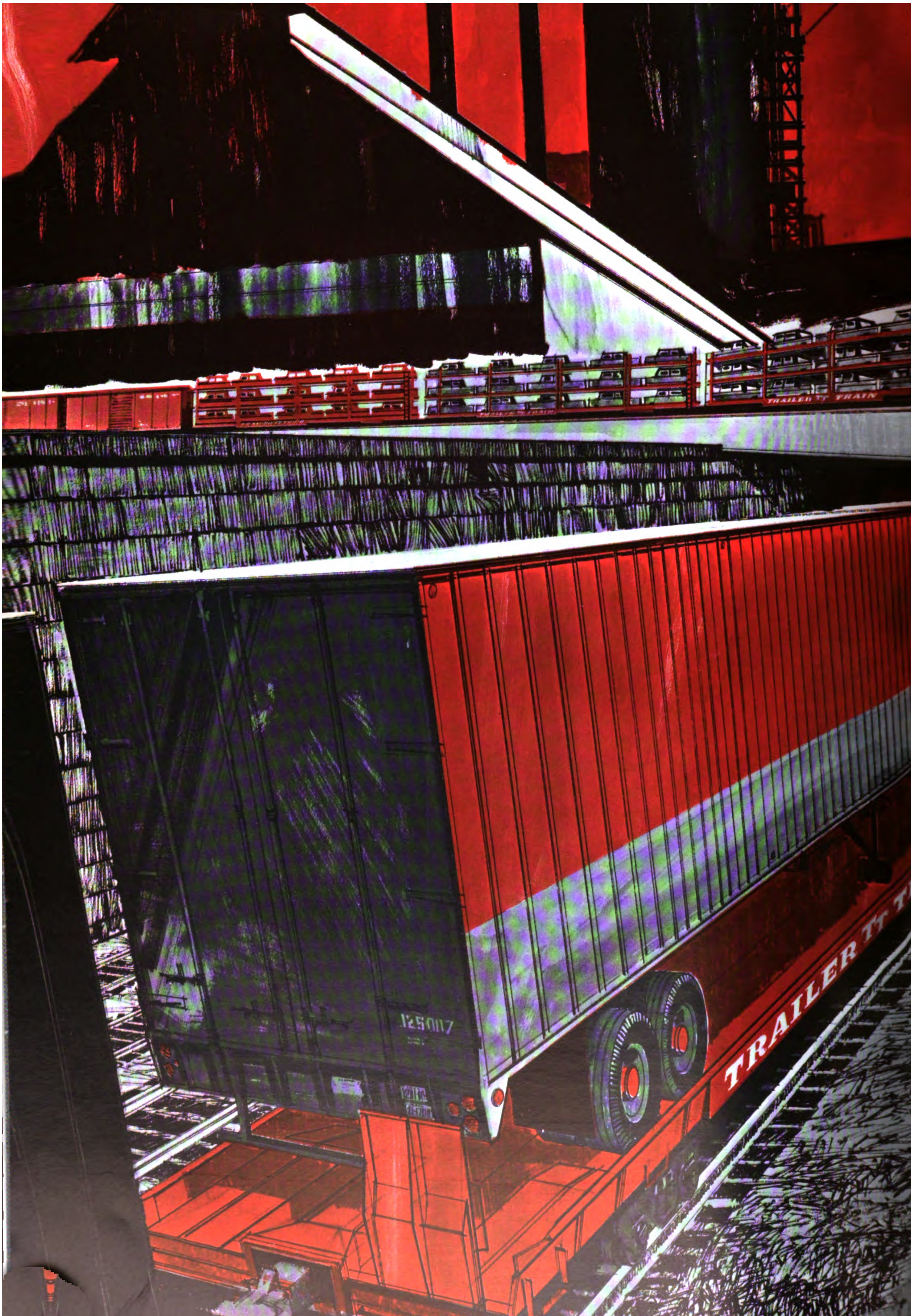
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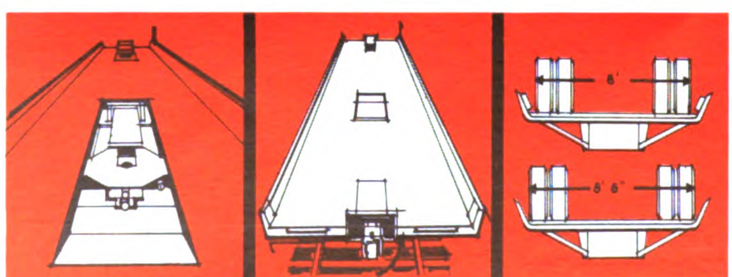
PIGGY-BACKING USA:

What's Piggybacking USA? It's running high-speed piggyback trains on passenger train schedules through the tunnels of Eastern and Western mountain ranges. It's running under the close clearance bridges and viaducts of U.S. market centers. It's linking East and West through a steel highway designed to economically move the nation's goods, materials and merchandise.

As a major supplier to Trailer Train, Pullman-Standard has pioneered the development of flat cars for all types of piggyback service, but has given special attention to the unique operating requirements of low clearance areas. In 1961, Pullman-Standard developed the LO-DEK 89 for low clearance automobile rack service. And now, P-S has introduced a new model LO-DEK 89 which provides the ideal vehicle for low clearance hauling of bi-level and tri-level automobile racks plus all highway truck trailers regardless of size or width (including the now talked about 8′-6″ trailers).

Recessed center stanchion, flat non-skid deck, integral steel end ramps, improved chain tie-down devices . . . these are just a few of the features offered in this new flat car.

Trailer Train, in its efforts to provide its members with the best equipment for low clearance piggyback hauling, has recently placed 100 new model LO-DEK 89s in service. And more are on order. For an illustrated brochure on the new LO-DEK 89 contact your nearest Pullman-Standard sales office or write George L. Green, Vice President—Marketing.



RECESSED STANCHION Permits faster trailer loading.

FLAT DECK Ideal for auto rack application.

CONVERTIBLE SIDE SILL For 8′-0″ and 8′-6″ trailer widths.

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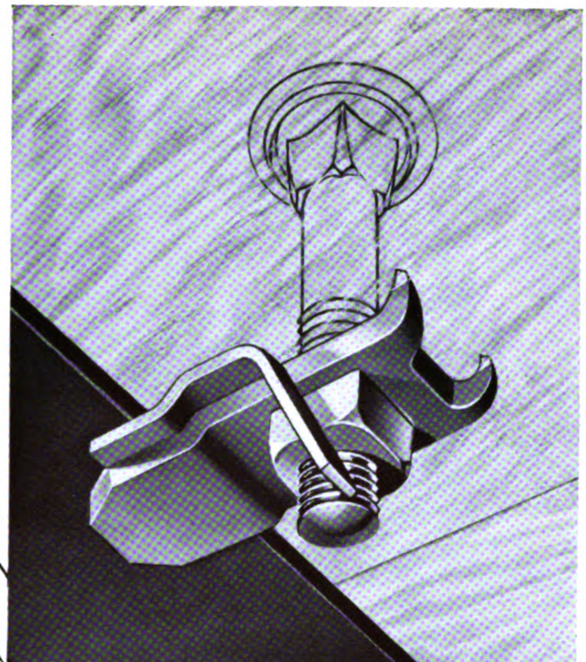


M-F WATER-TIGHT BOLTS

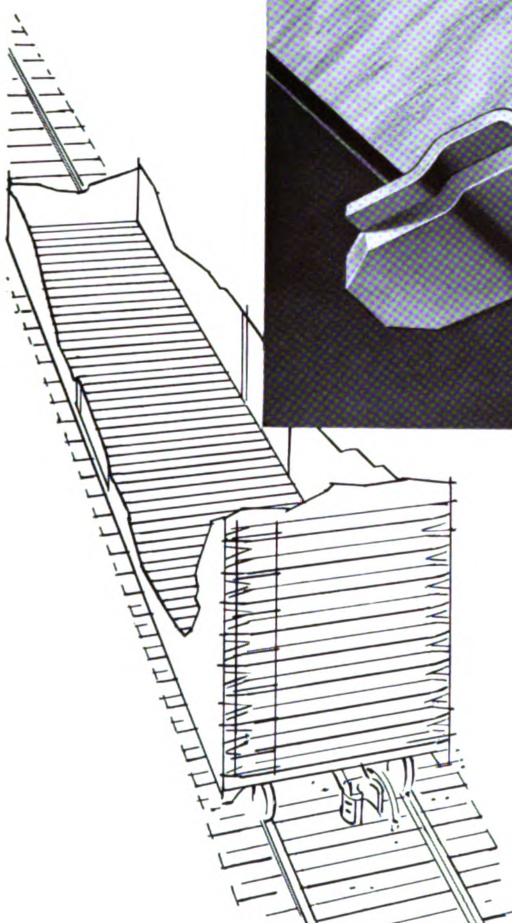
The bolt that has proved its superiori millions of times in tens of thousands cars. Goes in flush in all modern floor m terials including Hardwood, Composit Laminated, and Pine Floors. Simples most effective bolt available.

M-F LOCK-TIGHT FLOOR CLIPS

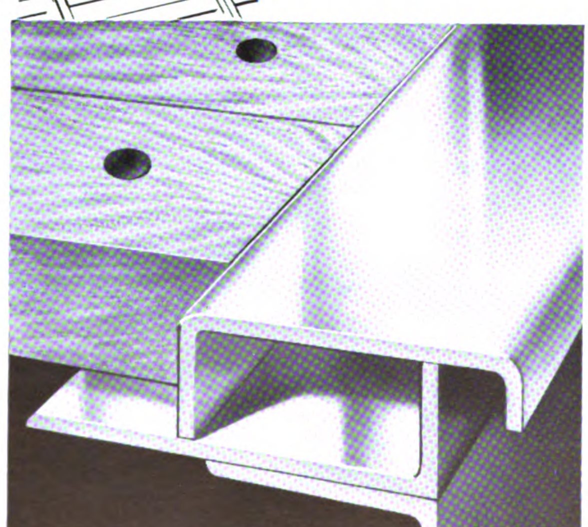
The time-honored way to secure floo boards to sills; ideal for floor fastening t I-Beam Stringers. Major features of th M-F Lock-Tight Floor Clip are:

- No holes have to be drilled in sills.
- No holes to line up when attaching floor
- The bolt may always be applied on th center line of the floor board—eliminat ing warping and cracking.
- Floors which have shrunk may be tight ened simply by jacking and applyin new boards to fill the space.
- Nut lock on clips makes clip "Lock Tight" permanently.
- For use with M-F Water-Tight Bolts

M-F Lock-Tight Floor Clips are ideal fo repairs, a must in rebuilding, and a stand ard on new car construction.



602 WAYS TO APPLY BETTER CAR FLOORS...



There are 602 MacLean-Fogg products fastening the floor in an average box car. Three hundred M-F Water-Tight Bolts with Regular Square Nuts and three hundred M-F Lock-Tight Floor Clips, plus two M-F Threshold Plates. Car Builders and Railroads use these M-F Floor Fastening Products and have done so for 35 years because they make better cars. M-F Products are easy to install, reliable to use, and help to postpone overhauls. Specify M-F Products.

M-F THRESHOLD PLATES

M-F Threshold Plates are permanent structural parts of a Box Car . . . used to form a strong sill in the doorways. They are used extensively in new cars and in rebuilding programs. Permit easy removal and replacement of floor boards; strengthens the car in the doorway; maintains door alignment.

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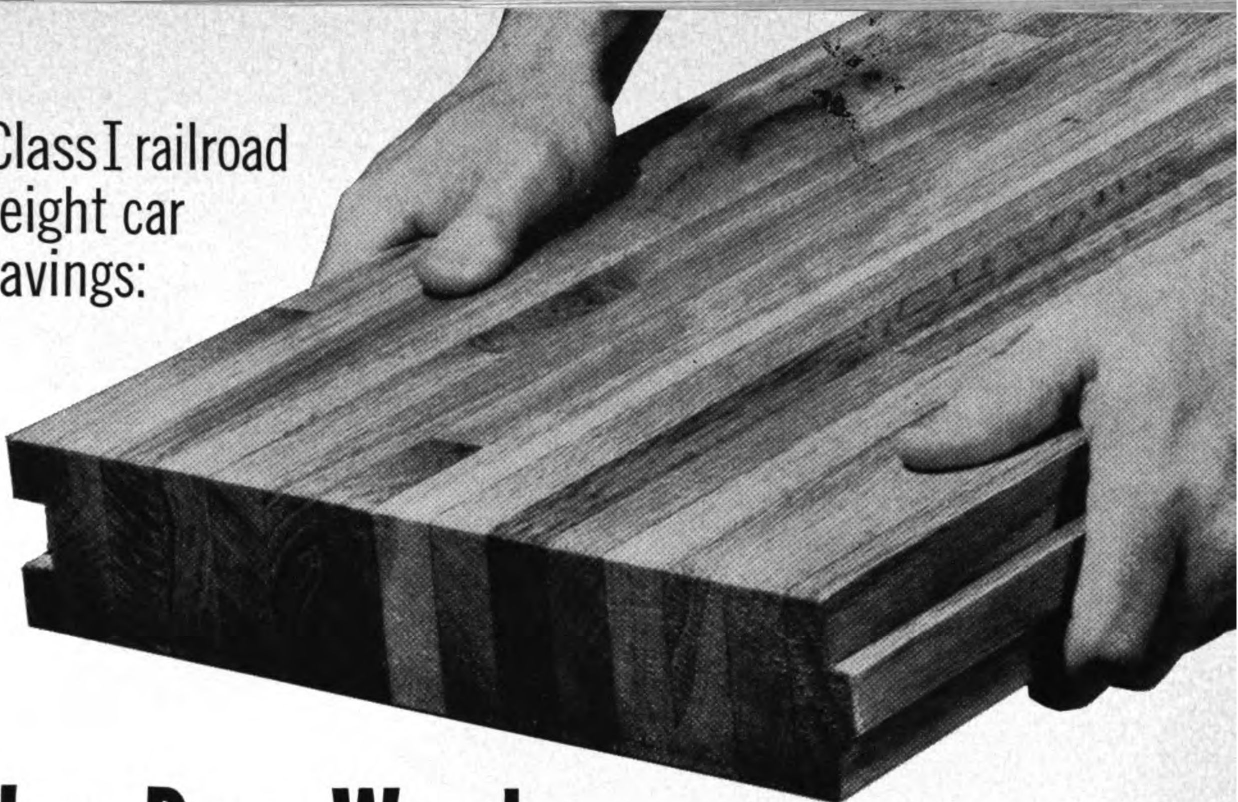
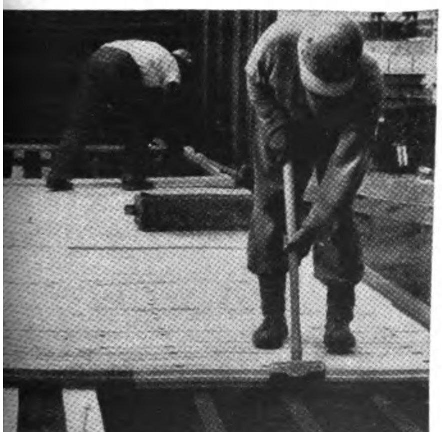
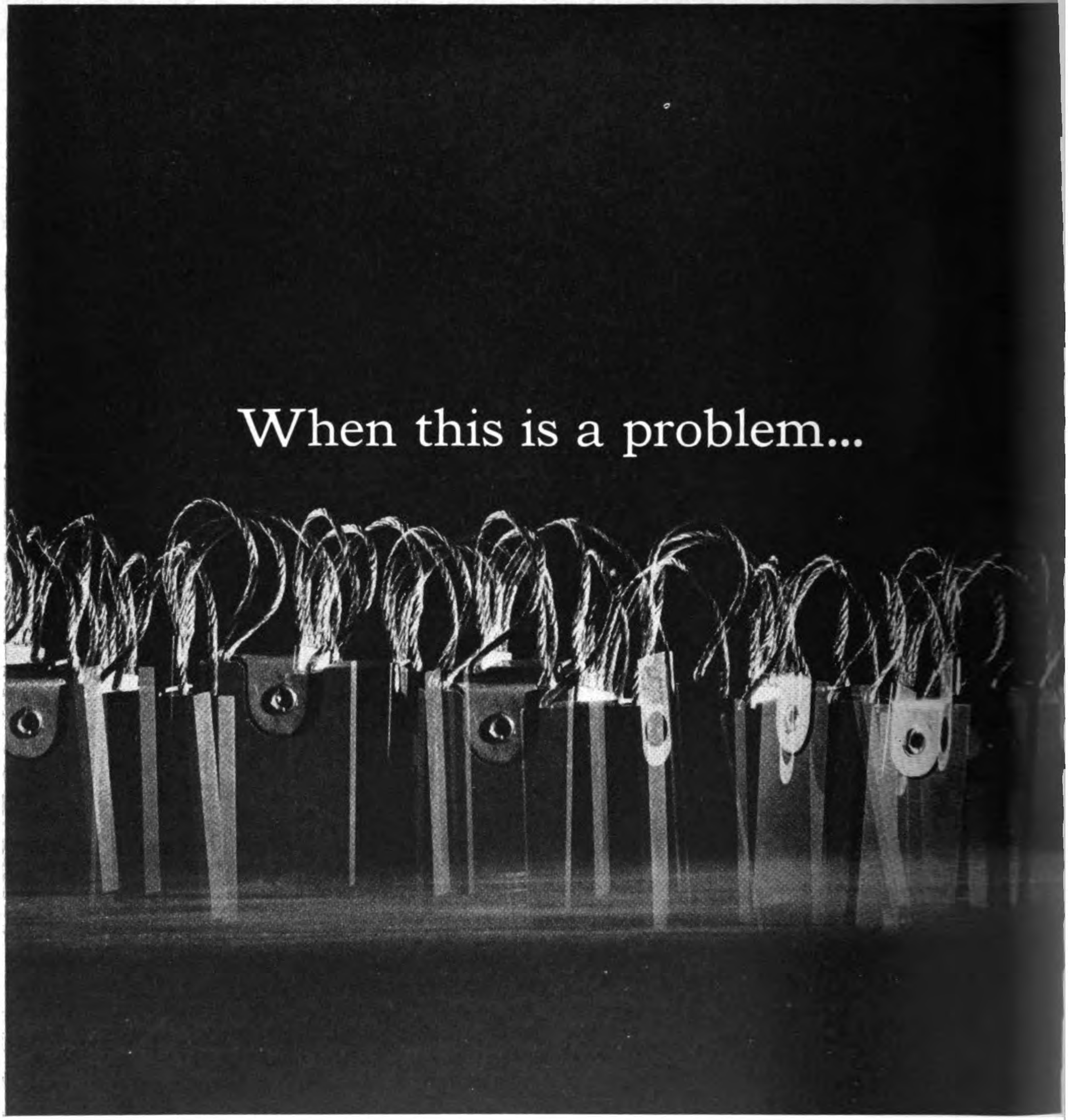





Electro-Motive Parts MAKE the Diesel Locomotive!
When the component part must do its job deep in the heart of the Diesel engine, nothing can be left to chance. Electro-Motive crankshaft bearings, like these being installed in this GP-30 production line photo, were manufactured in an electronically controlled casting line.



this is the answer

It's that little neoprene pad (red) that takes the shakes. Sort of a buffer that reduces vibration, eliminates uneven wear and lengthens brush life. You get improved commutation, more uniform wear, lower operating costs; no broken hammer plates, no shunt fraying, less flashovers, less commutator threading. You get Speer Red Top Multiflex Brushes, one branch of a large and efficient family of high quality brushes for electrical rotating machinery. To get to know the family better, write for complete details.

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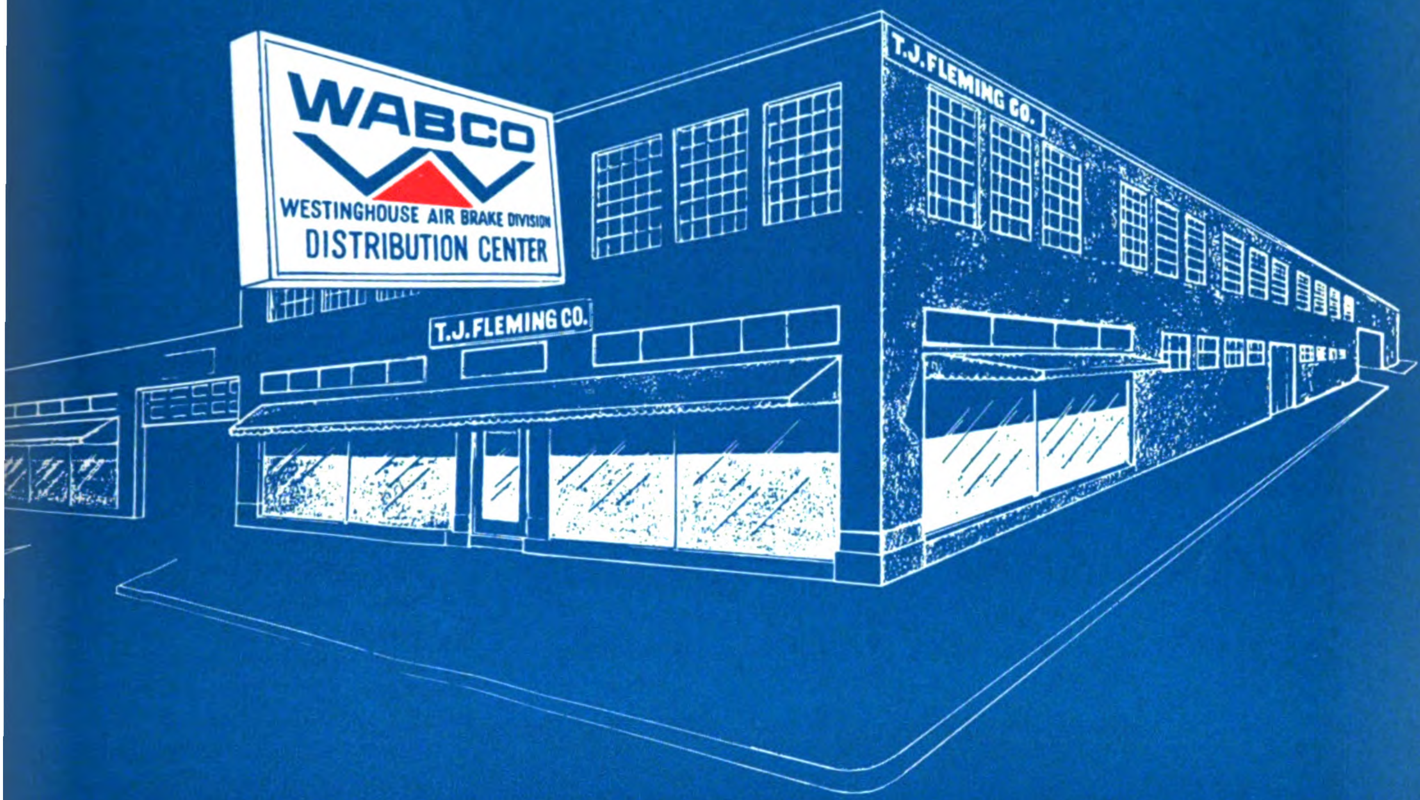

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WESTINGHOUSE AIR BRAKE DIVISION

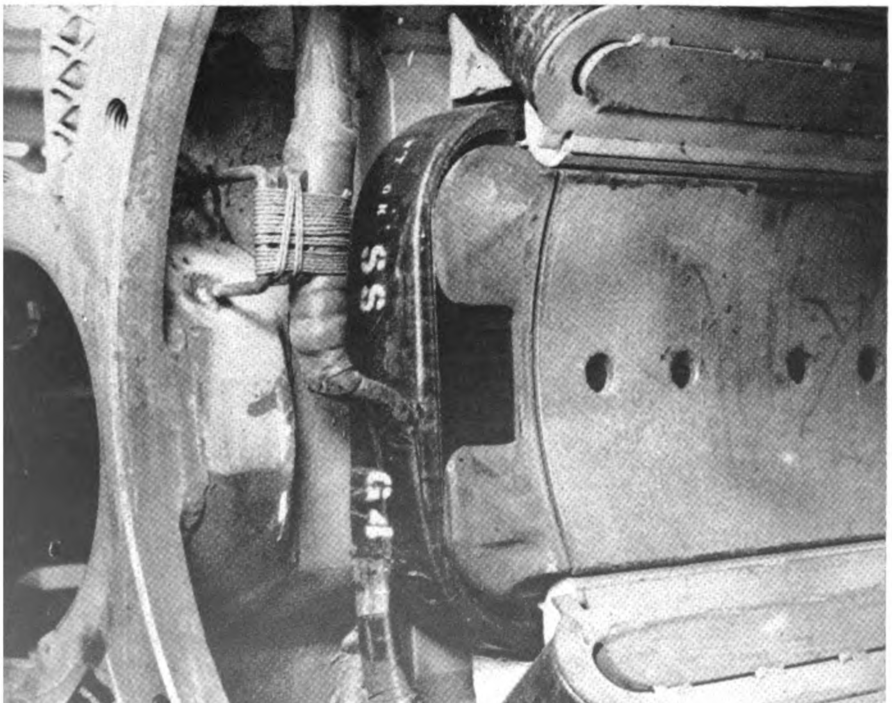
WILMERDING, PA./Westinghouse Air Brake Company

Be sure to visit our exhibit at The American Railway Progress Exposition.

Fatigue failure in series coil connection is typical of those encountered in traction motors. Coils in this motor have been insulated with conventional elastomer tape.

Energy Dampers Cut Coil Connection Failures

By M. M. Fromm, National Electric Coil Division of McGraw-Edison



Axial energy dampers are installed between coil connections and steel brackets welded to motor frame. Upper damper is held in position by glass tying cord.

Control of vibration and shock loading can lengthen traction-motor service life and lower maintenance cost. Energy dampers can be highly effective in performing these functions both in nose supports and coil connections, lowering stresses far below failure levels. Strain and vibration measurements made recently on a typical traction motor installed in a locomotive in main-line freight service showed the effectiveness of dampers in eliminating coil-lead breakage due to copper fatigue.

Vibrations in traction motors of main-line locomotives have been found to cause mechanical damage to structural members and lead to electrical failures of insulation through abrasion or separation of thermally deteriorated materials. Vibrations are excited by the many forces acting on the motor, a structure too complex to permit easy mathematical analysis.

The destructive effects of these vibrations have long been known. Manifestations such as cracked and broken shafts and bearings, slipped pinions, broken armature heads, and powdered insulation were found by the Pennsylvania to be the result of gear wear (RL&C, Jan. 1960, p 24). Studies of damage produced by forces introduced through the motor support have led to the adoption of elastometric units in place of the original spring supports. In many motors, ¾ in. carbon-steel wear plates have been completely worn away. The Missouri Pacific has reported effective control of motor vibration with the use of rubber nose supports (RL&C, Aug. 1962, p 22).

In some cases the cast-steel motor frames have actually been worn away by coil insulation. Frames have been found with the weave of the outer insulation tape etched in the steel. Coil failures are frequently caused by abrasion of the insulation, resulting when coils loosen on pole pieces so that differential movement occurs between coil, pole piece and frame.

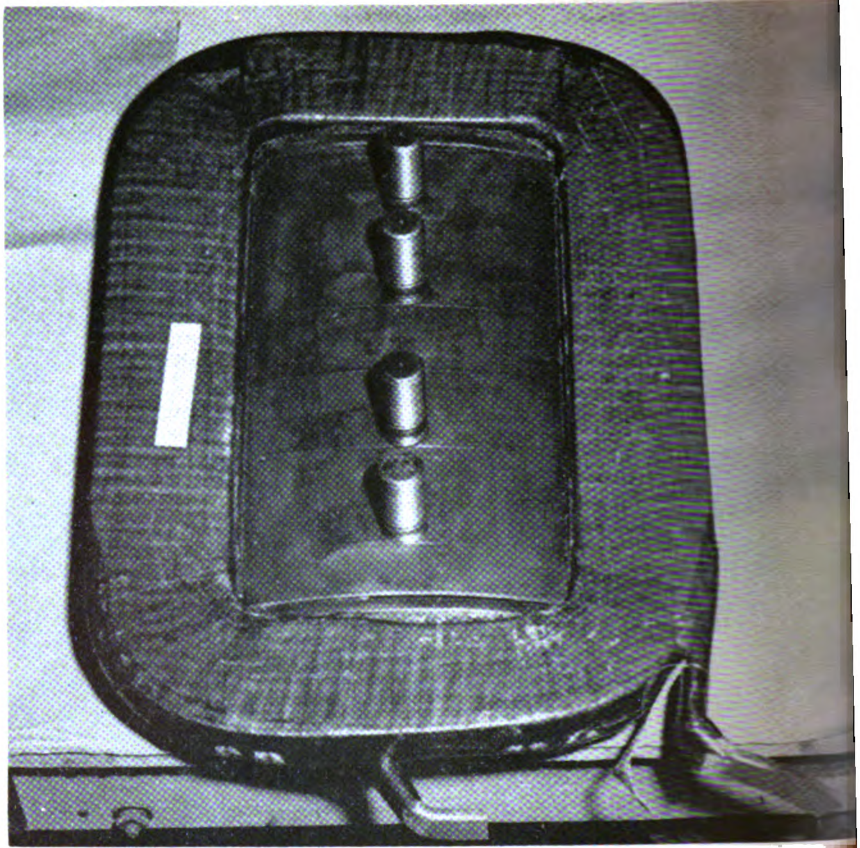
Solid brazed connections between main field coils insulated with the elastomer, or varnished mica insulations were sometimes found broken. The lead failure rate increased, however, with the introduction of epoxy resin impregnation and potting on the pole piece, procedures which solved several other problems. This type of failure is due to fatigue under cyclic vibration, probably starting with a nick

or other stress raiser and accelerated by heating as the crack progresses across the conductor section. Such failures are usually accompanied by overheating and burning of insulation as the current-carrying area gets smaller and smaller.

These problems resulting from vibration have been solved in two ways. Differential movement leading to insulation abrasion is prevented by potting main and commutating coils on their pole pieces. Breakage of coil connections has been completely eliminated by the use of axial energy dampers which limit the amplitude of vibration, decreasing resulting stresses far below the endurance limit of the copper used in coil leads.

This National Electric Coil study was designed to investigate, with the cooperation of an Eastern railroad, the strains and vibrations on the traction-motor frame, nose support, and the coil connections during operation. Strain gauges were mounted on top of the frame in the axial and cross-axial directions. A gauge was mounted on the upper nose block. Gauges were

(Continued on page 44)



Epoxy-resin bonding of field coils on pole pieces prior to installation in motor frame pre[...] differential movement of these parts for the life of the traction motor.

Railroading across the Rockies at 10,221 feet puts locomotives through a tough workout!

Denver & Rio Grande Western gets power for the peaks with NATIONAL Brushes
TRADE-MARK

The Rio Grande system daily operates heavy-tonnage freight trains east and west via the Moffat Tunnel and Royal Gorge routes—through the heart of the spectacular Colorado-Utah Rockies.

All the varied and rugged operating conditions common to mountain railroading are encountered in crossing the Continental Divide at two points—9,239 feet above sea level inside the Moffat Tunnel and 10,221 feet at Tennessee Pass.

Competitive schedules are maintained with remarkable regularity, assisted by the dependable performance of NATIONAL brushes. They provide top-quality commutation—with minimum commutator maintenance—over the entire system.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.

Contact Mr. National Carbon

UNION CARBIDE

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NATIONAL CARBON COMPANY

125 curves in 66 miles with grades up to 1.8% demand severe cycling of diesel power!

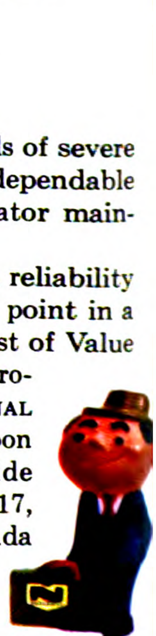
Lehigh Valley handles tough terrain and fast schedules with NATIONAL Brushes

TRADE MARK

Between Buffalo and New York the Lehigh Valley maintains unsurpassed service despite stretches of track that push locomotive traction motor and main generator brushes to the utmost.

Miles of steep mountain grades—leading into one curve after another—heavy-tonnage trains, and frequent acceleration and deceleration combine to spell tough railroading for diesel equipment. Keeping on schedule through this rugged terrain calls for dragging and dynamic braking—in short sequence. Through long periods of severe cycling, NATIONAL brushes provide dependable commutation with minimum commutator maintenance.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.



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Energy Dampers Cut Failures *(continued from page 40)*

mounted on the connection between two series coils. All these strain gauges were Baldwin-Lima-Hamilton etched foil type. The gauges on the frames and nose block were cemented with an air-drying liquid epoxy resin. On the coil connection, a heat-curing epoxy resin was used with a small piece of 2-mil integrated mica forming the ground insulation for the gauges. Mica splittings were used under and between gauge leads to insulate them.

A steel block welded on top of the frame served as the mounting for two vibration pick-ups. Along with a third pick-up mounted vertically on the frame, it was possible to sense vibrations in three perpendicular planes. The three pick-ups were connected to separate IRD vibration analyzers which have output jacks for a signal to an oscilloscope.

The instrumented motor was mounted in the No. 3 position under the locomotive. The instruments, consisting of three IRD vibration analyzers, two Minneapolis - Honeywell two-channel bridge amplifiers, and a Honeywell Visicorder, were all mounted on a rack made fast to the concrete counterweight in place of the steam generator. Connecting cables between instruments and motors were dropped through a rectangular hole in the floor just in front of the counterweight and carried over the No. 4 motor to the test motor. The cables and gauges showed no signs of damage when removed after the test. A rubber-energy damper was installed in the traction-motor nose instead of the conventional spring pack.

The locomotive with the test motor, an Electro-Motive F-7 unit, was trailing in a three-unit consist hauling a 57-car stone train. Later, the locomotive handled a 133-car coal train.

Records were taken periodically during the trip at various speeds and loads. Generally speaking, the effect of speed on strain and vibration was much more marked than the effect of load changes. Strain gauges on top of the frame showed very little activity at all speeds from 13 to 52 mph.

The strain gauge on the upper nose block generally showed a low frequency with a high-frequency harmonic. The low freqency varied from 5 to 12.5 cycles per sec (cps) with no definite relation to the motor speed, while the high frequency was always around 500 cps. The maximum stress measure in the nose block was 150 psi.

The coil connection, which was installed with energy dampers, showed a very unexpected activity when the speed went up to 50 mph. At lower speeds, there was a small strain of constant amplitude at about 500 cps. At 52 mph, with the diesel engine either idling in first notch or full speed in the eighth notch, the frequency increased to 600 to 900 cps, but the amplitude increases and decreases with no regularity. It appears to be excited at a low frequency, then dies out and reappears again in a short time.

At 52 mph, the maximum amplitude of this strain was three to four times greater than that at speeds up to 25 mph. This developed an average stress in the copper of about 350 psi, far below the endurance limit of copper used in coil leads which is 17,000 psi at 300 x 10^6 cycles. The energy dampers do not change the frequency response of the connection, but decrease the amplitude of the strain, hence lowering the stress. Since their introduction, broken series coil connections have been completely eliminated.

The source of the high-frequency oscillations is not easy to locate. The table shows sources of vibration and their frequencies. At 50 mph, the armature slot ripple is the only source anywhere near the observed frequency. It is hard to see, however, how the relatively small voltage at the thirty-fourth harmonic could excite the heavy section connector between coils. The exciting force might be the second harmonic of the gear, or a harmonic of diesel engine power strokes, either of which would be low enough to have sufficient energy to excite the connections. Much more study would be required to identify the source of these high-frequency vibrations.

The cause of the irregularly pulsed increase in strain amplitude in the coil connection cannot be determined from the data. It is too irregular in inception and duration, but may be connected with diesel-engine operation. This fluctuating high-frequency strain probably was the cause of lead breakage before the energy damper was used. The damper does not change the frequency of vibration in the connection, but reduces the strain amplitude to safe levels.

Motor Vibration

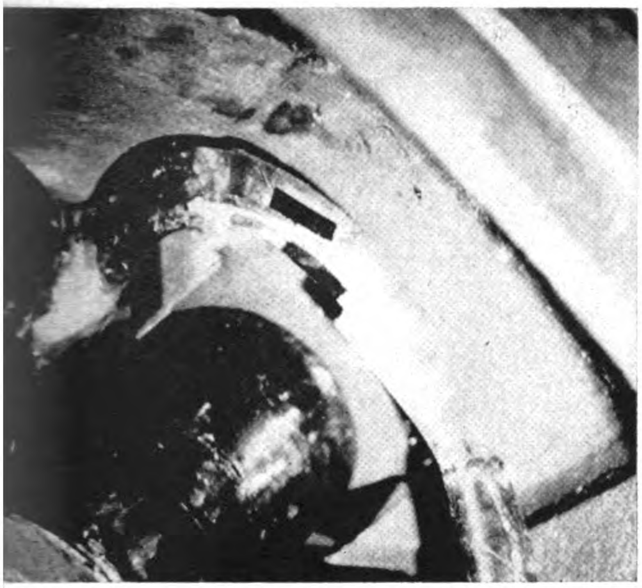
Motor-frame vibration across the track showed several mixed frequencies. The high frequency was about 67 cps; the low frequency ran from 4 to 22 cps. At speeds below 50 mph, the amplitude of the cross-track vibration showed a maximum up to .030 in. peak to peak. However, at 52 mph, both in first and eighth notches, this amplitude went up to .100 in. This vibration may be caused by the motor sliding on the axle, or the whole truck shifting between the rails, with movement limited by the wheel flanges.

Motor-frame vibration in the vertical direction has a 30-mil amplitude at speeds up to 52 mph where its amplitude also increased to 100 mils. This vibration was also complex, with a high frequency around 50 cps and low frequency about 8 cps.

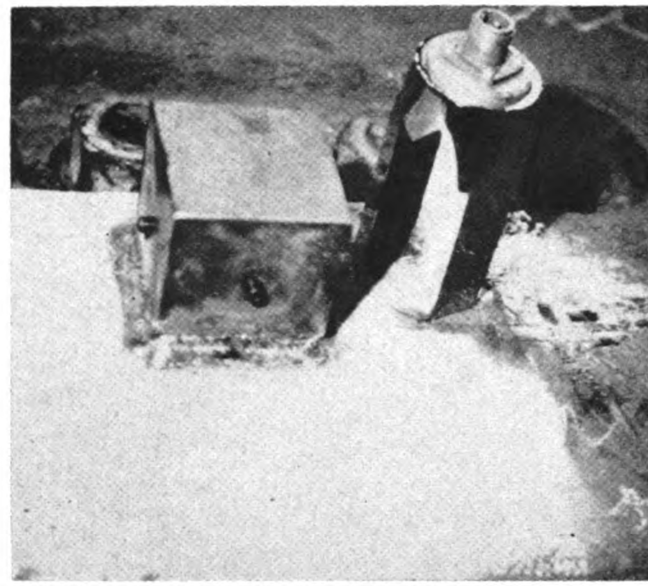
The vibration of the motor frame in the direction of train motion had an amplitude of only 10 mils at all train speeds, indicating that vibration in this direction is not significant.

Vibration Sources—Frequency/sec

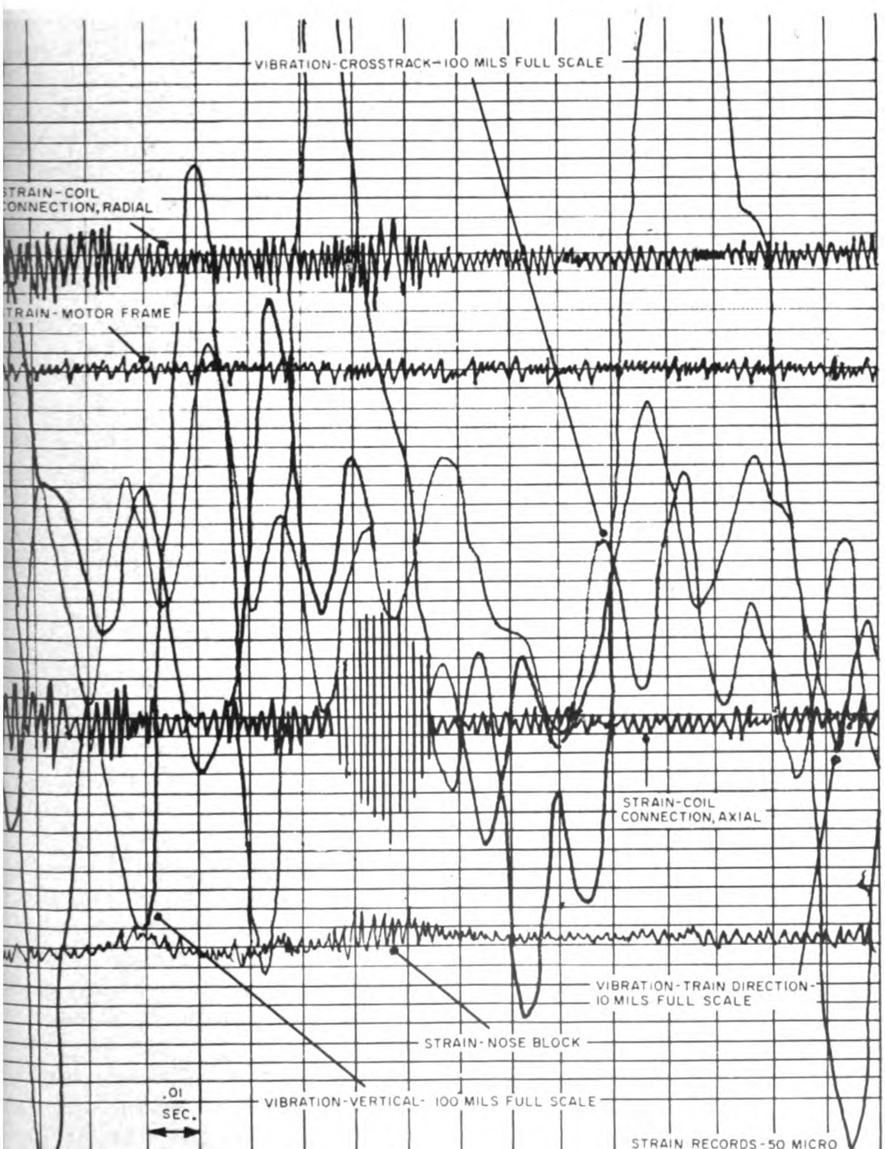
	Locomotive speed, mph				Remarks
Source	10	20	30	50	
Wheel speed	1.4	2.8	4.2	7.0	40-in. diameter wheel
Motor speed	5.8	11.6	17.4	29.0	62/15 gear ratio
Rail joint	.48	.75	1.1	1.9	39-ft/joint
Ties	5.9	11.8	17.6	29.6	Avg. 2.5 ft/tie (est.)
Pinion gear teeth	87	174	261	398	15-tooth pinion
Armature coil frequency	11.6	23.2	34.8	58	4-pole motor
Diesel power strokes	—	—	—	214	800 rpm in notch 8
Armature slot ripple	198	395	592	987	70 slots—harmonic 34



l connections were fitted with strain gauges which would respond to lial and axial forces. Leads from instrumentation to these gauges re soldered before the entire connection was insulated.



Radial-direction vibration pickup was mounted on top of motor. Steel block with mounting holes for other two pickups is at left. Black spots are strain gauges at right angles cemented to frame.



Typical chart record shows four strain and three vibration records from gauges and pickups in and on motor produced while locomotive operated at 52 mph in Throttle Position 1. Motor current was 100 amp.

The shock load due to these vibrations can be calculated, assuming that the different frequencies in each wave are roughly sinusoidal. With n = frequency in cycles/sec and R = half amplitude, in., the maximum acceleration can be calculated:

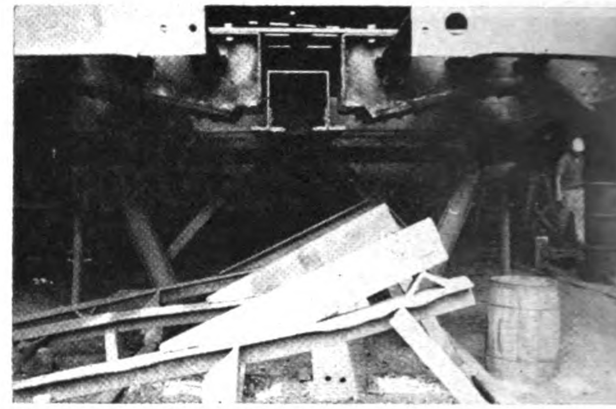
$$G_{max} = \frac{4\pi^2}{32.2 \times 12} \times n^2 \times R$$
$$= 0.102\, n^2 R$$

Across the track, the maximum half amplitude was .050 in. at a frequency of 22 cps. Under these conditions, the shock load on the motor was 2.5 G. There was also a vibration of about .004 in. half amplitude at 67 cps. When this was in phase with the lower frequency wave, it added a load of 1.8 G. This would make a total of 4.3 G in the axial direction.

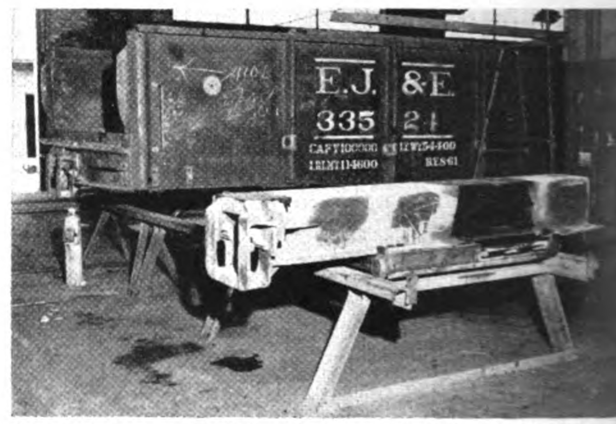
Perpendicular to ground, the maximum shock load was about the same, 4 to 4.5 G. This action is caused both by the motor rocking on the axle against the rubber nose support and by the truck moving up and down.

In this preliminary study, the data obtained shows a pulsing high frequency strain at high speed in the brazed connection between main field coils. This could be the factor which caused fatigue failure in the connection before the energy damper was introduced. In the test motor equipped with dampers, the stress in the coil connection was less than 5% of the endurance limit, which eliminates lead breakage due to copper fatigue. The maximum stress observed in the motor-nose support, using a rubber nose mount, was 150 psi.

Flange is welded after casting is jacked in place against old sill.



Original draft sill is skidded to one side after it is cut out.



Cast-steel-sill end is rolled under car and jacked into position.

Cast Sill Ends Welded in EJ&E Cars

Diamond-shaped reinforcing plates are already in position; welding is only partially done.

A reduction of 60% in welding time is being achieved by the Elgin, Joliet & Eastern in its Joliet, Ill., car shop through use of two semi-automatic Linde Sigmatic welding machines for rebuilding center sills of 50-ton gondolas. In reconditioning the 500 cars, which were built in 1942 and 1943, an eight foot length at each end of the center sill is replaced by a cast-steel end supplied by Buckeye Steel Castings Co. The EJ&E mechanical department reports that Sigmatic welding reduces overall costs, causes less problems in fitting up and gives better penetration and stronger welds.

The worn end sections containing the draft gear and center plate components are flame-cut from the center sill and dropped down on skid rails for movement from beneath car. Ends of the center sill are beveled 45 degrees to match the bevel on the castings. The new ends are then placed on wheeled jigs, rolled under the car, jacked in place and butted against the old sill. By using two SWM-11B machines simultaneously, one at each end of the car, and by equipping them with HW-11 water-cooled torches, welding is completed in one pass on the base, web and top of center sill on the outside. Thickness of the center sill sections are 3/8-in. in the web, 5/16-in. on top and 5/8-in. in the flange. The two vertical welds on the flange are welded by uphand method.

Welding rod used is 1/16-inch Oxweld No. 65. Current is 240 amperes at 26 volts, direct-current reverse polarity. Shielding gas flow at 15 cubic feet-per-hour is a mixture of 95% argon and 5% oxygen. The equipment can deposit up to 15 pounds of metal per hour. Power is supplied by two Linde SVI-300 units. This operation was formerly done with a 3/16-inch stick electrode. Labor savings are reported in the ratio of two to one.

Sigmatic is also used to weld the bolster cover plates to the center sill and to install five 3/4-in. mild steel diamond-shaped plates to the center sill as reinforcements. One plate is applied to the top, two to the flange and two to the center sill base.

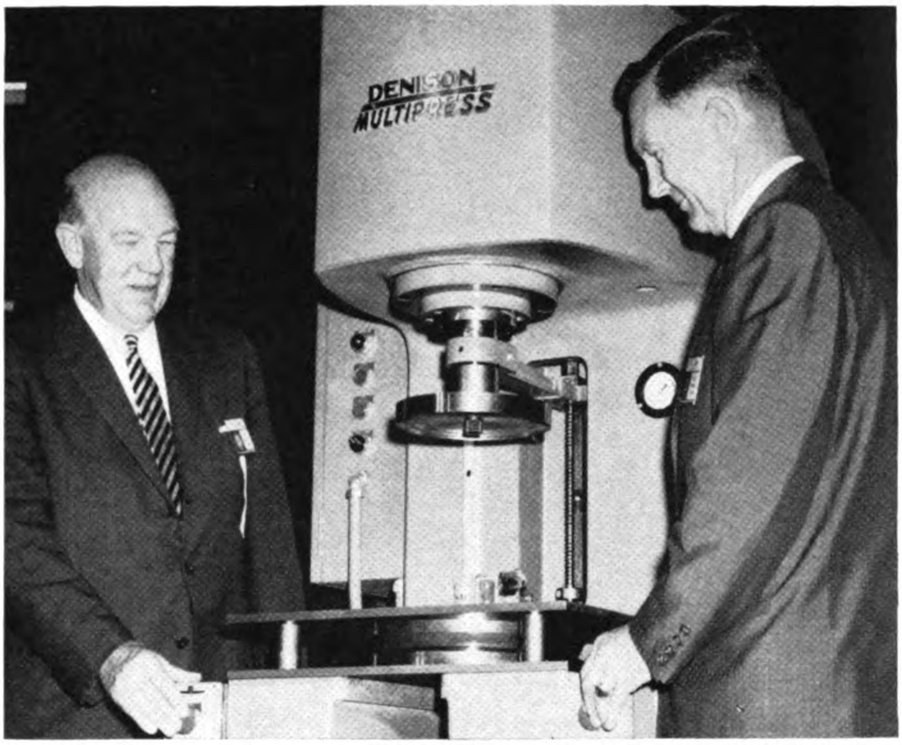
\illionth
.P Bearing
y Timken

gold-plated roller bearing was mbled at Timken Roller Bearing's ımbus, Ohio, plant on August 15. bolizing the one-millionth "AP" 'oad roller bearing produced since design was introduced in 1954 the l-plated bearing was put through final assembly operations during cial ceremonies held at the plant. I. H. Timken, Jr., chairman of the ıken board, and Ohio Governor ıes A. Rhodes assembled one of two inner races. Timken president, R. Timken, and W. T. Rice, Atlan-Coast Line president, put the sec- race together. Both Mr. Rice and L's chief mechanical officer, J. W. vthorne, were special guests at the emonies because the ACL installed first "AP" all-purpose bearings on ght cars in 1954. The road, with ›ut 12,000 freight cars fitted h roller bearings of all makes, has highest percentage so equipped.

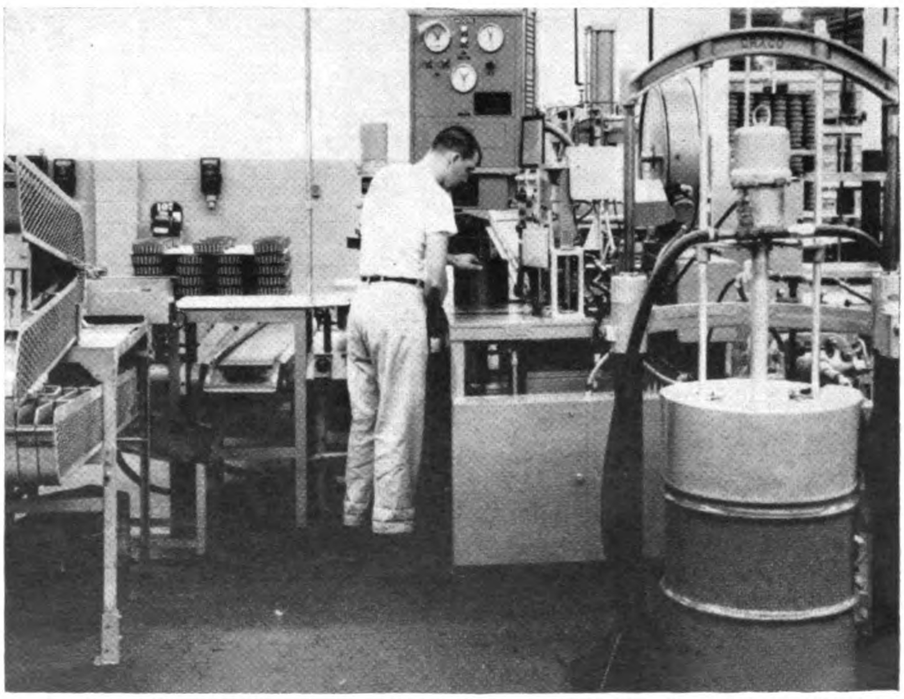
\fter the bearing was assembled R. Timken made a surprise an-ıncement of an immediate 5% ce reduction for the Class E 70-ton l the Class F 90-ton "AP" bearings. reduction was made possible, he 1, "because of the wide acceptance his bearing and the consequent full ization of our two automated pro-ction lines. This is the best way we ›w of saying thank you to the ıerican railroads."

H. E. Markley, Timken's executive e president, and M. S. Downes, ıeral manager, sales, of the com-ıy's Railroad Division, told about lroad applications and the devel-opment of the "AP" bearing. Mr. Downes presented the accompanying tabulation showing the number of "AP" bearings shipped to customers since its introduction. He estimated that 250,000 bearings or approximately 31,000 car sets, will be shipped in 1963.

As of July 1, 1963, domestic applications of Timken bearings, including Canada and Mexico, totalled 118,535 freight cars for mainline service. Of these, 1,260 were 5 by 9 in. (Class C); 28,167 were 5½ by 10 in. (Class D); 68,799 were 6 by 11 in. (Class E); 19,958 were 6½ by 12 in. (Class F); 146 were 7 by 14 in. (Class G); and 205 were miscellaneous sizes.



W. R. Timken (left), president, is assisted by W. T. Rice, ACL president, in assembling the inner races of gold-plated roller bearing symbolizing million AP models produced since 1954.



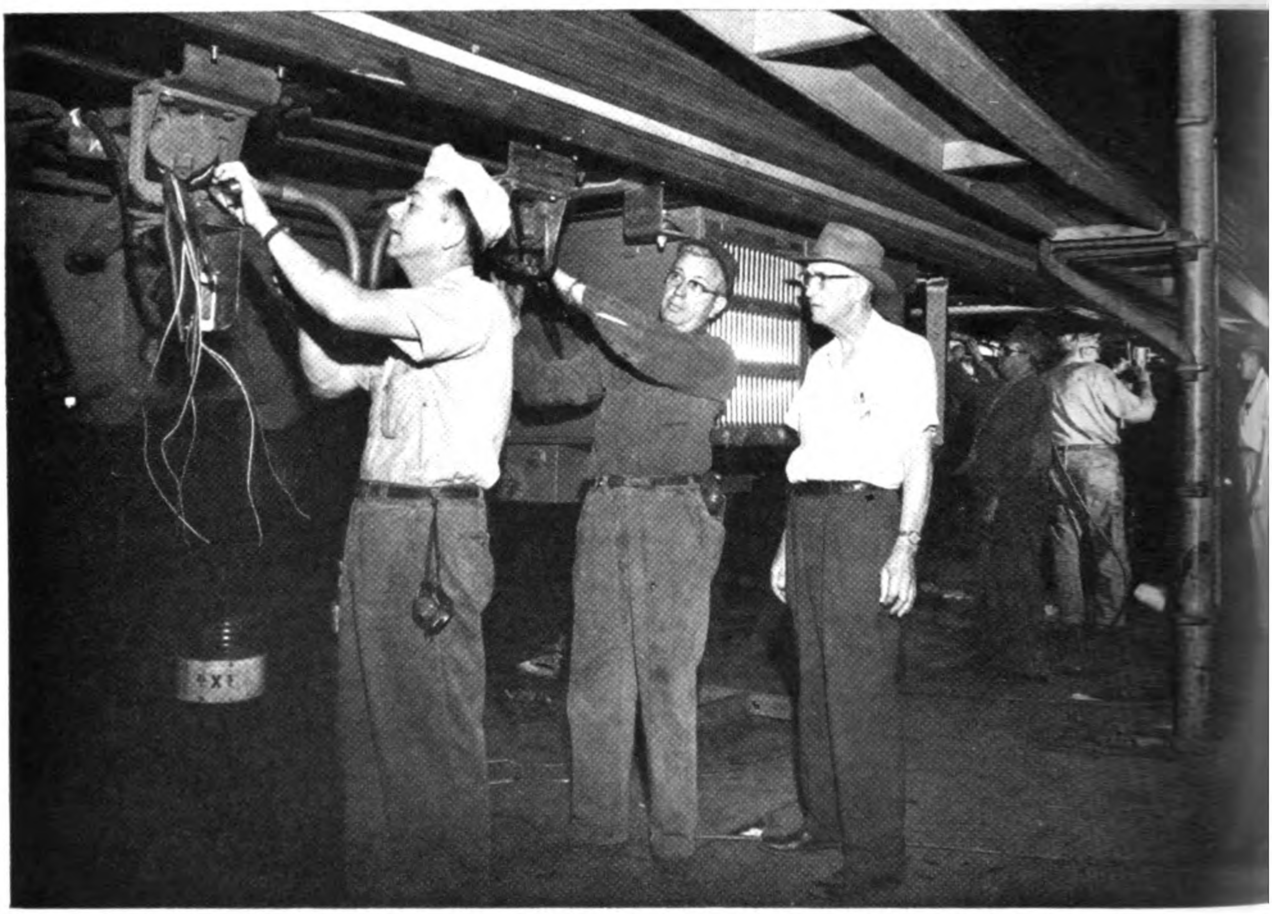
Final station on line assembles cup, two cones and spacer, checks them for clearance. After this, quantity of grease, metered by weight and volume, is added to the bearing assembly.

Bearing Shipments

'ar	Number of Bearings	Number of Car Sets
54	4,855	607
55	35,044	4,380
56	57,319	7,164
57	66,049	8,256
58	27,889	3,611
'59	151,788	18,974
'60	208,252	26,032
'61	145,799	18,225
'62	162,249	20,281

New GP-35s will speed Mass-ter Movement freights in GM&O coal hauling operation


GM&O
602



Electro-mechanical air conditioning is replacing the original steam-ejector equipment; new controls are also being installed.

L&N Cars Get New Air Conditio

Twenty rebuilt and updated passenger cars are to be in service on Louisville & Nashville trains by year's end. The South Louisville, Ky., coach shop, which has been working on this equipment for several months, expects to complete the last car in December. Involved are ten coaches, four diners, four tavern-lounge cars and two RPO cars.

In addition to their regular classified repairs, all these cars are being fitted with Budd disc brakes and the passenger-carrying cars are receiving new electro - mechanical air - conditioning equipment and improved electrical control systems. Permanent stainless-steel steps are replacing the folding-type steps on several of the coaches. As they are completed, the cars go into service on Cincinnati-New Orleans and Chicago-Atlanta runs.

Each car is stripped of all readily removable components before it enters the coach shop. These parts are then channeled to the seven coach-shop sections for cleaning and repair. The bodies are scrubbed inside and out prior to spotting on one of the seven repair tracks in the shop. After the body is elevated for repair and installation of the new air-conditioning equipment, trucks are moved to the adjacent truck shop for application of the disc brakes.

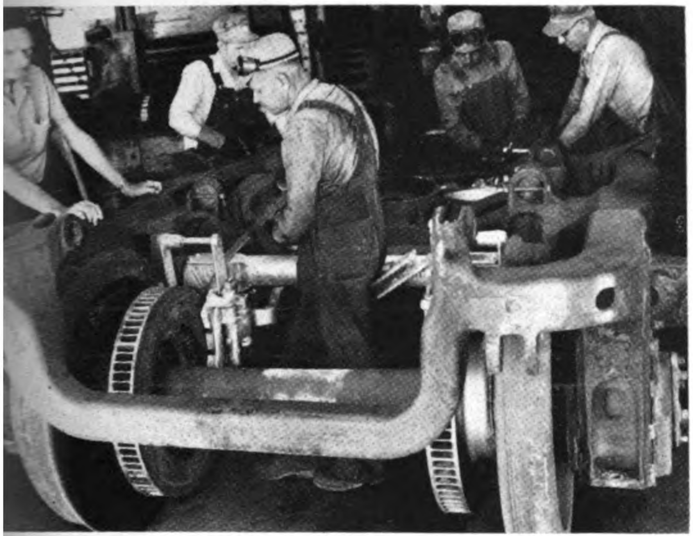
The electro-mechanical air-conditioning equipment, supplied by Safety Electrical Equipment Corp., has a capacity of eight tons and replaces the original steam-ejector installation. The L&N says the new system is more practical for today's train operation. It allows the car to be cooled without a steam source, either locomotive or stationary. Longer trains have presented problems in getting steam back through a large number of cars. The new equipment also allows individual cars to be pre-cooled in stations more readily.

The unloader unit, part of the compressor, permits the machine to operate at reduced capacity unloading one or more of its four cylinders. The air conditioning capacity of the c thus be cut to 7.5, 5.0, or 2.5 t 25% to 75% reduction. Pr changes sensed at the expansion on the evaporator operate the u er, helping to maintain even ten tures in the car and lengthenin of the air conditioning equipme cause it is not constantly cycli and off. The L&N's last seri coaches and diner-lounge cars, with individual dining and bu cars are already equipped with el mechanical air conditioning.

Modernization of the heating tem is actually done through sim cation of equipment and con The original zone type heating e ment is replaced with the Vapor zone system. The manually ope air conditioning and heating co panel is located in an electric lock each car.

Car heating is controlled by a t mostat in the body of the car w regulates two Vapor F-968 steam ulators supplying steam to the sys

upholstered seats with plastic headrests are installed in car.



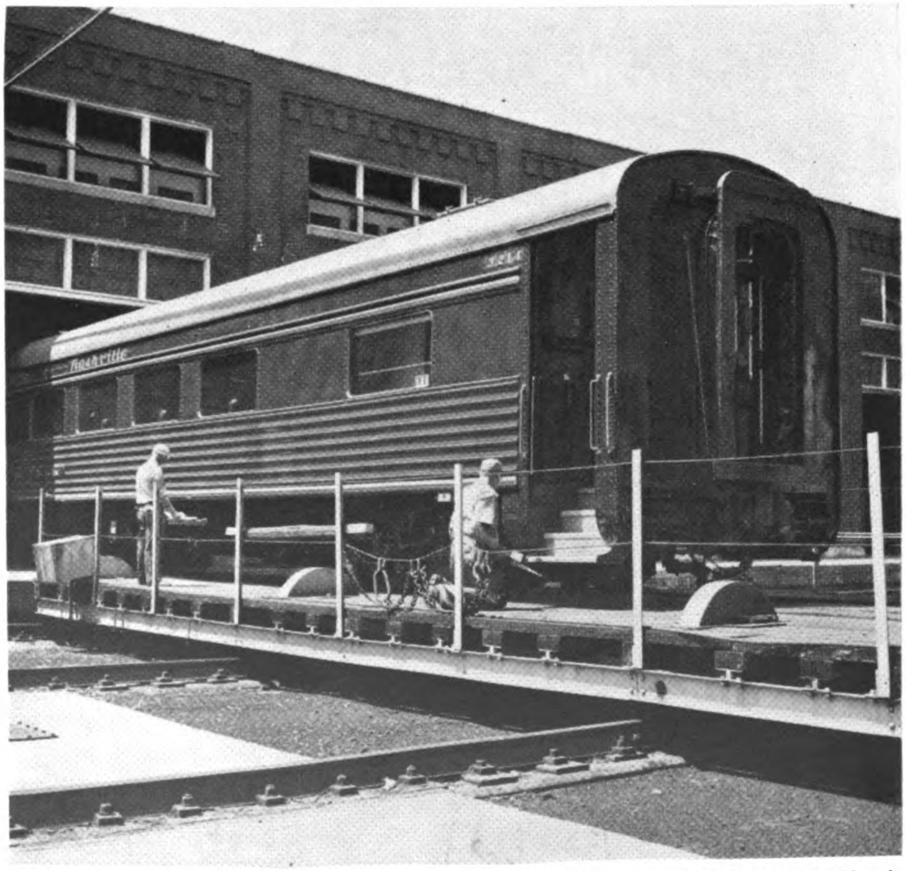
rakes are put on the trucks of all cars being reconditioned.

Fixed stainless steel steps are replacing folding type.

l Heating

fin radiation. Thermostats are lo-d in the aisles of the tavern-lounge dining cars, and on the outer wall ie men's lounge in the coaches. All mostats are placed about 6-ft ve the car floor. The heat control it in all cars is 76 deg F during the it and 71 deg F during daytime rs.

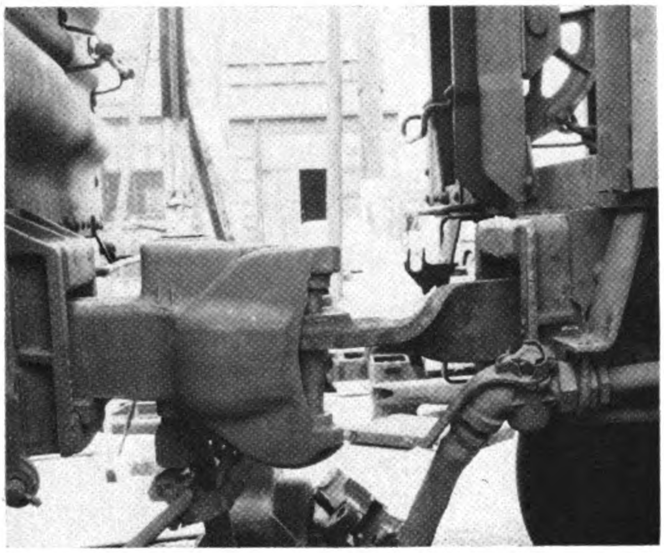
'wo-stage cooling is controlled by Vapor thermostats. The first e provides 25 per cent of the cool-capacity. If the temperature con-es to rise, the second thermostat es the compressor to full capacity. itrol points on the cooling thermo-s are 78 deg F full capacity during it operation and 76 deg F partial acity. During daytime operation, thermostats cycle the compressor full operation at 74 deg F and 72 F partial operation. The two stage ling eliminates frequent tempera-e cycling and provides more accu-e control of temperature and hu-lity for maximum passenger com-t.



Upgraded coaches are being placed on through trains as they come from shop. The 32-volt electrical system is being displaced by a 64-volt system installed during the shopping.

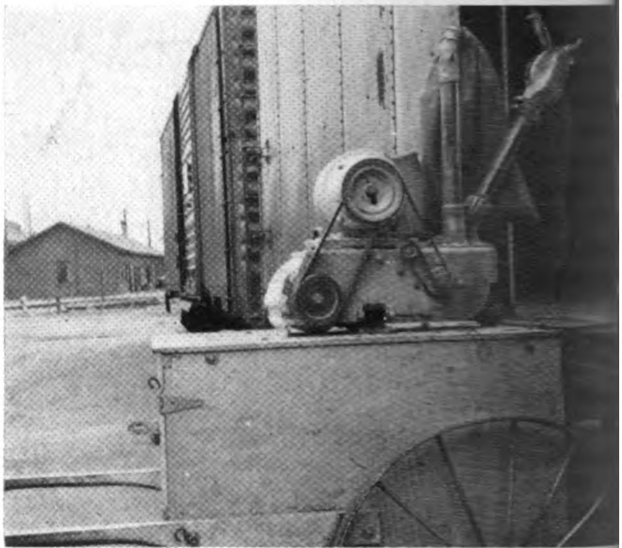
Car Repair Time Savers

Towing Bars



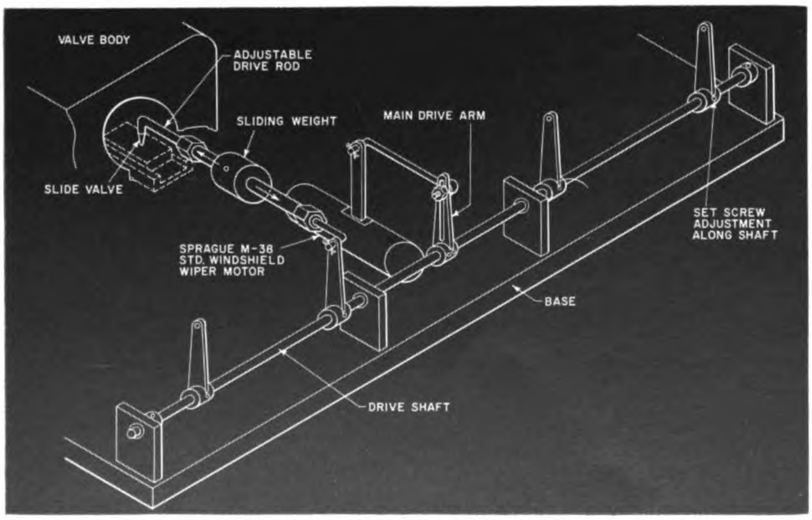
Towing bars made from sides of scrap coupler yokes are standard equipment on Illinois Central wrecker at Markham, Ill., car shop. Their use makes it safer and faster to move cars with broken couplers, eliminating chains. A 90-deg twist is put in the yoke section opposite the draft-key slot and the end is built up to take a knuckle pin. With damaged coupler removed from the end of the car, slotted end of bar goes in through striker casting and is secured by the draft key.

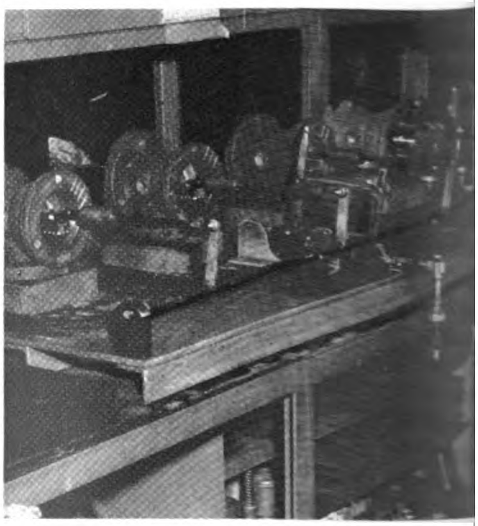
Floor Sander



Sanding of box-car floors, a practice made necessary increasing shipper demands, has been simplified by a railroad which has assigned a two-wheel cart and tool for transporting the belt sander from car to car. Mo driven sander is secured by a locking bolt so it will not from cart, top of which is car-floor height. A hinged st plate on the cart bridges gap between top of the ha truck and the car floor, making it easy to move sander and out.

Air-Brake Slide-Valve Lapping Device





Lapping of several seats simultaneously is made possible by the device developed at the West Jacksonville, Fla., shop of the Seaboard. Installed in the air-brake department, the unit was developed specifically for lapping of the slide valves of air-brake portions. It consists of four arms on which weighted operating rods are instal These rods bear on slide valves which are in place in fo valve bodies. A fifth arm, mounted on the shaft with other four, is powered by a Sprague M-38 air-opera windshield wiper motor.

›AL Mechanizes Brushholder Cleaning

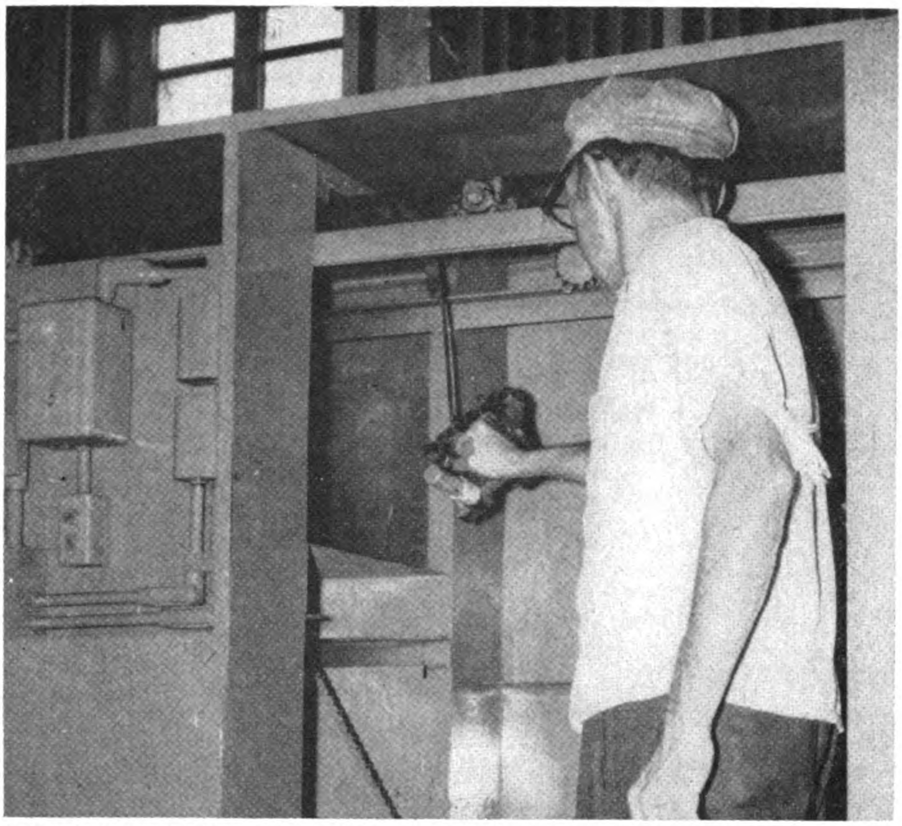
The cleaning of brushholders for ction motors and main generators Seaboard locomotives has been chanized. By ending hand cleaning the road's Jacksonville, Fla., shop, efficiency and effectiveness of the aning job has been increased. It ɔ is now possible for the mechanic o operates the brushholder clean- ; machine to do other work.

Housed in a cabinet 12 ft long and ż ft high are four tanks through ich the brushholders are moved ring the cleaning cycle. SAL en- eers spent considerable time select- ; solvents for removing the carbon st and other contaminants which ıt surfaces of brushholders when :y are removed from generators and ›tors.

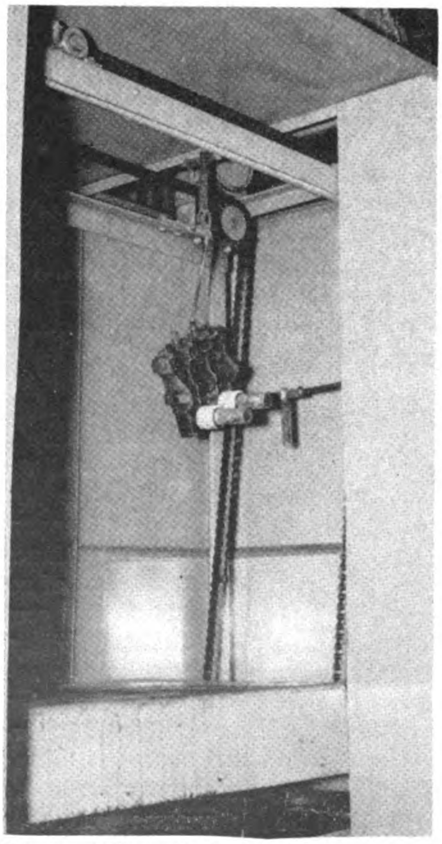
During the course of cleaning, the lders are suspended from hangers on ls between a pair of roller chains veling at approximately 1.5 ft per n. As the machine is presently ar- ıged, there are hangers for 24 brush- lders. The holders are loaded on the ngers at an opening on the right side the cleaning cabinet. They then ›ve downward into the first clean- ; tank. Passage through this tank solvent-based material takes ap- ɔximately 4 min. The cleaning tank made of 16-gauge galvanized and lds 95 gal. The chain then brings : holder out of the cleaning solu- n, allowing it to drain before mov- ; it into Tank 2, a rinsing operation ıere the holder is sprayed with high- ɛssure water from a series of noz- :s. Once again, the holder rinses d drains before going into Tank 3, dipping operation, using an acid ight dip. The final operation is a :ond rinsing with high-pressure wa- . The two rinse tanks of 35 gal ca- city are made of 16-gauge galvan- :d. The dip tank, also of 35 gal ca- city, is made of stainless steel.

The pair of roller chains are guided a series of idler sprockets and are ›wered from a 1¼-hp motor through speed reducer. Frame of the clean- ; machine is 2-in. angles; the hous- ;, aluminum sheets.

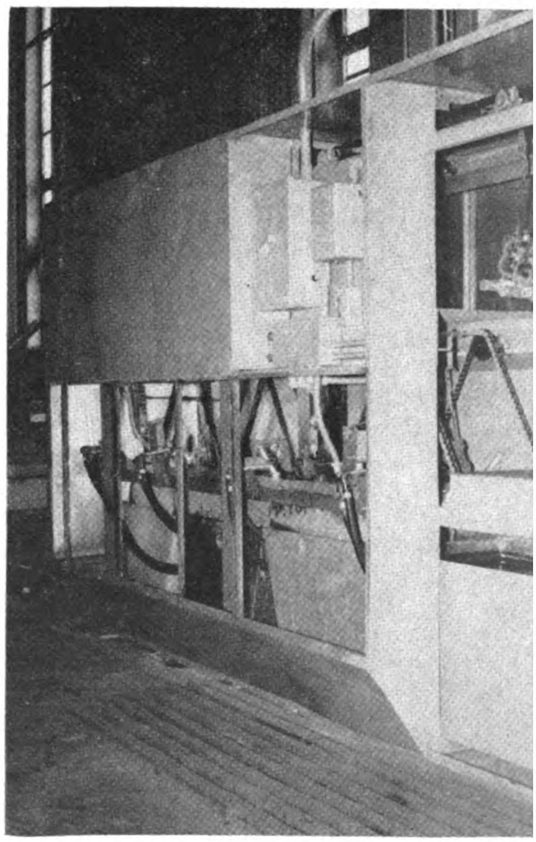
The electrical department of the est Jacksonville shop, where the ushholder cleaner is installed, is oled for complete rebuilding of ro- ting electrical equipment.



Mechanized cleaning has made possible a faster and more thorough reconditioning of holders. Chain drive continuously moves the 24 hangers through cleaning cycle.



Hanger positions holder so it is completely immersed in tanks through which is passes.



Four tanks in base of unit clean and rinse brushholders as they are moved through.

J. J. Dwyer

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Cutting Ring Breakage

What can be done to reduce the number of broken compression rings on diesel pistons?

While this problem can involve a variety of causes and solutions, an unusual number of broken rings can indicate need for investigation of fuel characteristics, particularly with respect to the sulfur content of the fuel. This has specific reference to the type of sulfur compounds present, not necessarily to their quantities. The procedure for investigation is relatively simple.

Petroleum products of the diesel fuel type contain compounds of sulfur which are stable to heat and may also contain some which are not. Unfortunately, the heat-stable sulfur compounds often smell bad. Some refiners treat distillates to make them "doctor sweet" so that they will have a better odor. In doing so, some of the heat stable sulfur compounds can be changed to sulfur compounds with a better odor but less heat stability. This refers to the non-corrosive sulfur compounds, not to free sulfur or to sulfur compounds which attack copper and other metals. The less heat-stable sulfur compounds will often decompose to give hydrogen sulfide at relatively low temperatures. Unstable sulfur compounds in diesel fuel, however, are not always the result of treatment.

Hydrogen sulfide, even in very small amounts, has been known to have been involved in embrittlement of iron and has been connected with ring breakage in natural-gas compressors. It has been our feeling that hydrogen sulfide, even as an interim product in the combustion space and ring area of a diesel engine, can promote embrittlement of the ring metal leading to ring breakage.

The following procedure can be used as a rough qualification test for the sulfur compounds in diesel fuel. Place a sample of diesel fuel in a test tube containing a polished copper strip and heat this fuel in a glycerin bath to 450 deg F at the rate of 10 deg a min. Observe changes in the fuel and copper strip as the temperature increases. Hold the fuel at 450 deg for 15 min and then observe the fuel and the strip. For suitable fuel, there should be no appreciable change either in the fuel or strip at temperatures up to 400 deg F. Sulfur compounds which are unstable to heat are indicated by a blackening strip, and this can be pronounced enough to produce peeling of the black deposit. Evolution of hydrogen sulfide can be confirmed by holding a piece of moistened lead acetate paper over the mouth of the test tube.

The best fuel is one which goes through this test without discoloration either of fuel or strip and without formation of any sludge within the fuel. This fuel will also hold this condition for 15 min at 450 deg F. Fuels which turn the copper strip black and throw down sludge at or below 400 deg F are considered to be unsuitable.

From our own experience, the only epidemics of ring breakage we have had were during periods when we used diesel fuel which turned the copper strip black and formed sludge below 400 deg F. When the use of this fuel was stopped, the ring breakage stopped. When the use of this fuel was again started, the ring breakage began shortly. The fuel was then discontinued permanently and the above described test was adopted as a qualification procedure. On an experimental basis, we have used fuels with as high as 1.5% sulfur compounds very stable to heat, without trouble with ring breakage.

The presence of hydrogen sulfide due to unstable sulfur compounds in the fuel may not be the contributing factor in all cases of epidemic ring breakage. But this factor is easy to investigate and should be a part of the study of possible causes.

T. A. Tennyson, engineer of tests, St. Louis Southwestern.

Maintaining Support Bearings

What solutions are available to problems arising from use of wheel-truing machines contributing to increased traction-motor support bearing failures and reduced attention paid to traction motor gear cases?

Wheel-truing machines should not be held responsible for motor-support bearing failures or for lack of attention to gear cases. When trucks are rebuilt, suspension bearings should have minimum clearances at collars and diameters. Other points where clearances should be minimized are motor noses, truck center castings, and between truck pedestals and the journal boxes. Ring and pinion profiles gear should be within builder's dimensions. Gear cases should be properly mated and secured with all the locking features provided by the manufacturer of the diesel-electric locomotive.

The truck suspension bearings and gear cases should then last the life of the wheels if only a little attention is paid to suspension bearing lubricating pads and oil is supplied to the reservoirs. Gear cases must be kept lubricated. Vibration in trucks is detrimental to suspension bearings and gear cases if wheel treads and flanges are not properly maintained. Intermittent wheel truing, without waiting until condemning limits are reached, will eliminate early failures of truck motors, suspension bearings and gear cases.

K. Pruchnicki, supervisor locomotive maintenance, Southern Pacific.

hat's New

(Continued from page 16)

urned 90 deg., the latch is moved to ical position. The cap is then swung en position ready for pneumatic hose iment. The car can be completely un- d from one side and the pneumatic cleaned in minutes. The finger tip ol adjusts rate of flow by partially ng or closing holes in the stainless sleeve to permit air to mix with con- of the car. North American Car Corp.

· more information, circle 9-7 on card ving page 60.

eel Truing Inserts

½-deg relief angle that provides clear- and minimizes tool pressure features Style WTS-10P round-button type l-truing insert. The inserts are stocked Kennametal Grade K4H and have oned cutting edges for high resistance hipping when milling work-hardened surfaces. Indexing is facilitated by re shank bolts with either hex or socket . Number of available edges depends epth of cut. Inserts are 0.625 in. dia- r, the same as Style WTS-10 inserts h are not superseded. Kennametal Inc.

or more information, circle 9-8 on card wing page 60.

draulic Crane

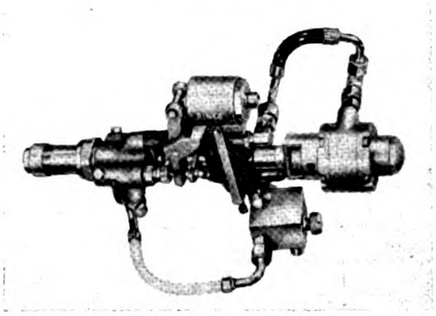
RT57 Push-Pull full hydraulic crane be used as a yard crane or railroad car cher. Hydraulically operated, variable- tion car couplers, mounted front and , permit the crane to approach and ple cars from any angle and provide ter versatility and safety on curved ks and through switches. The "live- boom" head of the crane is equipped with a pusher plate which can be used to correct shifted loads and straighten damaged car doors, as well as to move cars. Diesel power or LP gas is optional. Grove Manufacturing Co.

For more information, circle 9-9 on card following page 60.

Electrical Heating

Electro-Wrap, a method for heating industrial pipelines, valves and tanks with a heavy duty electrical tracer-strip, is said to lower capital and maintenance costs and to cut heating expense. It is 3½ in. wide and less than 1/32 in. thick. Temperatures range up to 300 deg F, and its low-density heat of 1 watt per sq in. is specially suited for temperature sensitive applications. Operation is on 115 volts, a-c or d-c. Electro-Trace Corp.

For more information, circle 9-10 on card following page 60.



Mixer Gun

The two-component gun, Model 18FM, is designed for spraying or pouring urethane foams, epoxy and polyester resins. It can be used with various nozzles to spray or spray/pour up to 12 lb per min with air injection, or to free pour (no air injection) up to 6 lb per min. Degree of atomization or spray patterns can be controlled with a spray nozzle adapter which accommodates various sizes and types of nozzles. An internal round spray nozzle permits building foam thickness with practically no overspray or fog. The teflon round nozzle for general spray application of foam and the pouring attachment are supplied with each gun. The stainless-steel spray nozzle adapter is an optional accessory for use where fine finishes are required. For automatic dispensing or spraying or two-component resins, the model 18FA gun may be obtained. Binks Manufacturing Co.

For more information, circle 9-11 on card following page 60.

Car Ventilation

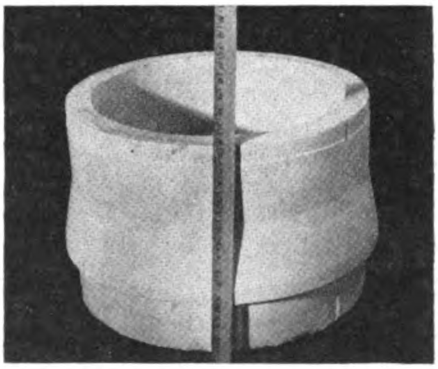
With a temperature reading of 105 deg outside, and a reading of 100 deg inside a demonstration transit car, 83% of those in the car reported the Quietor Heating and Ventilating System supplied sufficient air movement for maximum passenger comfort. Humidity was 82%. The system is composed of Quietor fans that intake fresh air either through the top or side of a transit car and Circu-L-Air fans in the roof that exhaust inside air during cold weather. In winter, the Quietor fans draw a minimum of fresh outside air. Heater strips in the fresh-air ducting and in the Circu-L-Air fans supply the necessary heat. The entire system—fan speed, temperature and louvre control—is under automatic Vapor Merc thermostatic control. Automatic ventilation and heat is provided under all conditions, and noise level, it is said, is held to a minimum. Air conditioning can be added in the system at the time of car building or later. Vapor Corp.

For more information, circle 9-12 on card following page 60.

Dielectric Coating

A single coating of Duricon dielectric fluid applied directly upon nonferrous metal surfaces, including copper and/or aluminum conductors, splices, circuit boards, boxes, motors, batteries and insulators, it is said, will seal the surface, repel moisture and prevent corrosion. It can be applied by brush, spray, dip or flow, air-drying in minutes and leaving a thin, clear, non-porous coating which is permanent at temperatures up to 150 deg C. Its dielectric strength is greater than 900 volts per mil at 3/10 mil average thickness. Duricon is compatible with most insulating materials. It is also fungus resistant and protects against oil, grease, alkali, most acids and chemicals. Coricone Corp.

For more information, circle 9-13 on card following page 60.

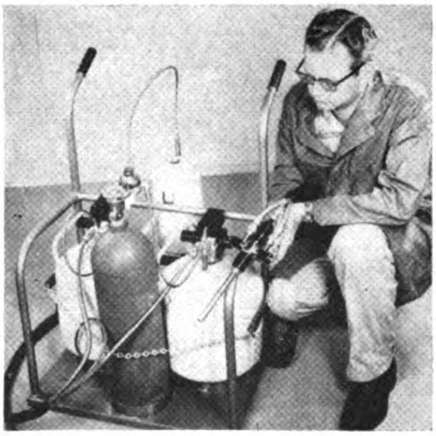


Refractory Ring

The Glasrock one-piece fused silica refractory ring for use in Vapor steam generators, it is said, replaces an assembly of 16 bricks of two different sizes and a metal jacket, and has a service life of 16 to 24 months. Correct convection is preserved because the choke ring remains uniform and does not crack from thermal shock; fuel savings result because of better combustion. According to the manufacturer, the ring is being used exclusively by one large railroad, has been adopted by another, and is undergoing test by several others. Glasrock Products, Inc.

For more information, circle 9-14 on card following page 60.

Urethane Foams



From a small hole drilled in the Urefroth portable aerosol-pressure tank rigid or flexible polyurethane froth foam can be injected into voids to insulate tank, passenger, or refrigerator cars. The Urefroth Systems, which operate by inert gas pressure, dispense up to 12 lb (6 cu ft) of pre-expanded foam per min, and component materials are delivered in refillable tank-type containers. Meters, which eliminate the need for temperature control equipment, maintain a continuous output within 1% in a temperature from 60 to 130 deg F. Models range in capacity from 110 to 1,000 lb per set up and foam densities, from 1.4 to 1.8. The Albatross dispenses 150 cu ft per min. Special operators training periods are not required. U... Process Machinery Co.

For more information, circle 9-15 on ... following page 60.

Cleaning Machine

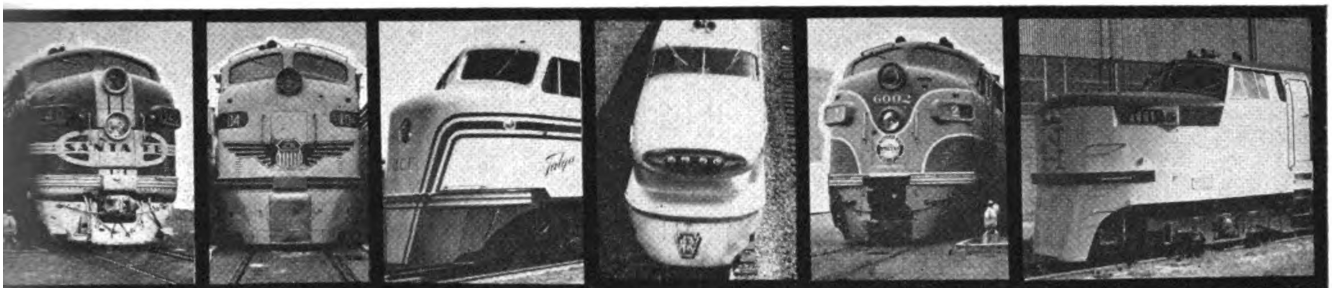
One stage of a semi-automatic machine that cleans metal parts inside and out at the same time is manually loaded through counterweighted sliding front door. It has four blasting guns mounted at angles to direct the cleaning abrasive to every part of the item being cleaned. The blasting guns automatically raise up and down as the product revolves on an automatic turn table. A manually operated blasting gun is also available for special or extra cleaning. The second stage has a transfer car type device which takes heavy metal objects which are loaded with power equipment. The transfer car then carries the item into the machine where, while revolving on a turntable, blasting guns mounted on a limit switch controlled screw move down and clean the interior of the product. The one man machine was originally developed for removing carbon deposits from diesel engine pistons, including ring grooves, intake and exhaust valves, and the refinishing of hard-chrome-plated liners. Vapor Bl... Manufacturing Co.

For more information, circle 9-16 on ... following page 60.

Megger Tester

The new transistorized megger tester has an insulation test range to 50 megohms at 500 volts d-c; a continuity test range from 0 to 20 ohms, supplied from a 9-volt battery; and a voltage test range from 0 to ... volts a-c or d-c. It features one-hand push button and dial operation; batteries which ... when plugged into a-c outlet, re-charge over night if completely dead; and built-in a-c/d-c voltmeter. Insulation and continuity scales are arranged with 1 megohm and 1 ohm, respectively, centered for maximum readability. A transistor converter supplies a stable output for the insulation testing range. The circuit is arranged to give 500 volts across a 1-megohm load. James G. Biddle Co.

For more information, circle 9-17 on ... following page 60.



Personal Mention

bama, Tennessee & Northern.—*Springfield, ..:* J. P. KNOX appointed chief mechani- officer.

timore & Ohio.—*Grafton, W. Va.:* S. R. RMER and A. R. UPTON appointed shop emen. J. D. CAVEY appointed supervisor ver plants. W. H. EAST appointed wheel ıp and machinist apprentice.

gor & Aroostook.—*Derby, Me.:* H. ALLEN ›NROE, assistant to mechanical superin- dent, retired.

lington.—*Denver, Colo.:* J. D. SCHROED- appointed assistant chief mechanical of- :r. Formerly assistant general superin- dent, motive power, at Chicago. *Chicago:* V. HON appointed assistant mechanical cer; A. J. HAVLIK, superintendent car de- ·tment, and G. W. HENDRICKER, me- ınical engineer.

nadian National.—*Quebec:* R. PASTERIS, ›ointed superintendent of equipment, ebec area, succeeding J. F. M. HUNE- LT, now assistant to the vice president and ıeral manager, St. Lawrence Region, ›ntreal. *Dauphin, Man.:* LAWRENCE ›ROBEY appointed superintendent of ıipment, Hudson Bay Area. Formerly istant superintendent of equipment, Sas- chewan Area. *Montreal:* W. L. DRAPER, ›erintendent motive power, named super- endent of equipment, succeeding R. BABB, nsferred. *Capreol, Ont.:* R. E. BRADBURY ›ointed assistant foreman-car. Formerly istant foreman Montreal Yard.

esapeake & Ohio.—*Newport News, Va.:* M. CHILDERS appointed general car ·eman, succeeding C. H. BAINES retired. *:hmond, Va.:* DELMER T. WILSON ap- inted general car inspector, succeeding r. Childers. Mr. Wilson formerly as- tant general car inspector, Columbus, ıio. *Walbridge, Ohio:* F. R. JAHNKE ap- inted general car foreman. Formerly car ·emen, C&O, Cheviot, Ohio. *Raceland, ..:* W. B. CHELLIS named manager, Race- ıd car shops.

·lorado & Southern.—*Denver, Colo.:* J. D. HROEDER, assistant general superintendent motive power, appointed assistant chief mechanical officer.

Frisco.—*Springfield, Mo.:* J. P. KNOX, assistant chief mechanical officer, appointed chief mechanical officer. (For sketch of career and photo see April 1963 issue, p 45).

Louisville & Nashville.—*Louisville, Ky.:* S. C. SNOW, superintendent motive power maintenance, appointed manager — motive power.

Milwaukee.—*Milwaukee, Wis.:* L. L. LENTZ appointed engineer of car design. L. P. BARRY appointed general foreman, succeeding Mr. Lentz. Mr. Barry formerly general car foreman at Bensenville, Ill. J. V. SANDS appointed assistant shop superintendent. H. F. SHANNON appointed district general car foreman, succeeding H. R. ANDERSON. T. E. SCHMIDT appointed assistant general foreman, succeeding L. A. LINDEMER. C. A. BORGH appointed assistant engineer train lighting. Formerly district general car foreman at Chicago. *Chicago:* W. C. GAGE named district master mechanic. *St. Paul, Minn.:* H. R. ANDERSON appointed district general car foreman, succeeding V. L. WATERWORTH. *Tacoma, Wash.:* W. C. MAUER appointed district general car foreman, succeeding Mr. Sands. *Savanna, Ill.:* L. A. LINDEMER appointed district general car foreman, succeeding Mr. Shannon. *Bensenville, Ill.:* V. L. WATERWORTH appointed district general car foreman, succeeding Mr. Mauer. E. J. MUELLER, appointed master mechanic, succeeding Mr. Gage. Mr. Mueller formerly master mechanic at Chicago.

Nickel Plate.—*Calumet, Ill.:* W. P. ARTHUR appointed general electrical foreman.

Pennsylvania.—*Philadelphia, Pa.:* E. L. PRICE appointed assistant master mechanic; J. E. HALL, assistant foreman, 46th Street Enginehouse. *Chicago:* W. D. VOLKMER appointed assistant foreman, 59th Street Enginehouse. *Cleveland, Ohio:* W. R. HANNAY appointed assistant enginehouse foreman. *Altoona, Pa.:* W. F. CARMAN appointed foreman, and R. E. CAMPBELL, assistant foreman, Altoona Car Shop and C. T. Yard. *Pitcairn, Pa.:* R. F. STEIN appointed assistant foreman, car shop. Formerly assistant foreman, Pittsburgh passenger yard. *Conway, Pa.:* N. F. THOMPSON appointed assistant master mechanic; J. S. BRZOSTOWSKI, assistant car foreman. *Erie, Pa.:* L. T. APPLE named motive power foreman. *Harrisburg, Pa.:* L. C. MILLER appointed assistant foreman, diesel shop. *Columbus, Ohio:* C. F. BRADNEY appointed assistant enginehouse foreman. *Camden, N.J.:* A. P. RUSCIO appointed motive-power foreman. *Richmond, Ind.:* V. J. HOOVER appointed motive-power foreman. *Morrisville, Pa.:* C. A. POOL appointed assistant car foreman.

Reading.—*Philadelphia, Pa.:* WALTER F. ALBRIGHT appointed road foreman of engines, Reading Terminal, succeeding RONALD L. PALSGROVE, retired. FRANK P. DALY appointed assistant road foreman of engines, Reading Terminals.

Richmond, Fredericksburg & Potomac.—*Richmond, Va.:* W. L. JONES, JR., supervisor passenger-car equipment, appointed supervisor mechanical equipment. C. LESLIE OGILVIE, general foreman passenger-car maintenance, appointed supervisor freight-car inspection. J. EMMETT FITCH, foreman passenger-car repairs, appointed general foreman passenger-car maintenance.

Rock Island.—*Chicago:* HENRY C. CHRISTIE appointed mechanical engineer. Formerly road foreman equipment, Little Rock, Ark.

Santa Fe.—*Chicago:* DAN CULBERTSON, general material inspector, retired.

Southern.—*Washintgon, D.C.:* RONALD T. BINNER appointed special equipment engineer, Marketing and Research Department. Formerly production and material control engineer at Spartanburg. *Spartanburg, S.C.:* ALBERT H. STEELE appointed production and material control engineer, Hayne shop. *Spencer, N. C.:* VIRGIL W. TREXLER appointed general foreman. *Charlotte, N.C.:* GEORGE M. WALTON appointed general foreman. *Chattanooga, Tenn.:* FLOYD C. MOORE appointed general foreman. *Birmingham, Ala.:* BILLY H. MCMICHAEL appointed general foreman. JAMES M. SHANNON appointed road foreman of engines. *Meridian, Miss.:* DEWEY F. BULLARD appointed general foreman car repairs. GEORGE E. MCCRARY appointed road foreman of engines. *Columbia, S. C.:* C. H. SMITH appointed road foreman of engines. *Danville, Ky.:* RALPH W. EMERSON appointed road foreman of engines. *Greenville, S. C.:* HARRY J. GOLIGHTLY appointed road foreman of engines.

Supply Trade

PULLMAN CO.—*J. E. Flannery,* chief mechanical officer, appointed assistant vice president-operating and chief mechanical officer. *Frank P. Adler* appointed mechanical engineer, Transport Leasing division with headquarters in Michigan City, Ind.

NORTH AMERICAN CAR CORP.—*Robert B. Oppenheimer,* manager of piggyback operations, named assistant general manager, Railroad Car Division, and elected a vice president of North American Car (Canada) Ltd. *Robert J. Landregan,* assistant chief mechanical officer, appointed director-mechanical department.

AMERICAN OIL CO.—*William E. Bon* named manager of railway sales department, succeeding *Milton A. Dixon,* retired.

DEARBORN CHEMICAL CO.—*Hal E. Eigner* named manager of West Coast District, with headquarters at San Mateo, Calif.

GOULD-NATIONAL BATTERIES, INC.—*R. W. Herbel* appointed district manager, Pittsburgh Region, Industrial Battery Division.

CITIES SERVICE OIL CO.—*Robert E. Vey* appointed head of railway sales, Pittsburgh-Cleveland-Detroit areas, with headquarters in Pittsburgh, Pa.

AMERICAN AIR FILTER CO.—*Joseph K. Sparrow* appointed manager of Transportation Products. Mr. Sparrow formerly supervisor of railway sales.

AMERICAN STEEL FOUNDRIES INC., A DIVISION OF AMSTED INDUSTRIES.—*P. J. Neff* named manager, Manufacturing Research Laboratory, at East Chicago, Ind.

AIR REDUCTION CO. — Additional research facilities being constructed at Murray Hill, N.J. for process research and development section of Air Reduction Sales Co., Airco welding products, and industrial and cryogenic gas manufacturing division.

SCREW AND BOLT CORP OF AMERICA.—*Otto G. Schwenk* elected president and chief executive officer.

SPARTON CORP., SPARTON RAILWAY EQUIPMENT DIV.—*Donald K. Burkel* appointed sales engineer.

ALBERTSON & CO.—One-story building under construction in Sioux City, Iowa, will provide 75,000 sq ft of space, permitting expansion of line of Sioux portable electric and air tools.

VAPOR HEATING LIMITED.—*John MacDonald,* assistant district manager of Philadelphia office of the Vapor Corp., now manager, sales and maintenance, of Vapor Heating at Montreal.

WESTINGHOUSE AIR BRAKE CO., WESTINGHOUSE AIR BRAKE DIV.—*D. F. Scherer* appointed manager—Renewal Part

., with headquarters at Wilmerding, succeeding *J. G. Rees. G. M. Cabble* inted representative at Atlanta, Ga.

F-NORTON CO. — *Albert E. Lake* inted sales representative in Boston, s., area.

Obituary

LAUD, 66, executive committee chair- and former board chairman and presi- , General American Transportation ., died Aug. 1 in Chicago.

eport *(Continued from page 10)*

chanical Division posals Are Voted

oting by member roads and car owners changes in AAR Mechanical Division rchange Rules, Manual of Standards Recommended Practices, and Wheel Axle Manual has just been completed. letter ballot, which was submitted on 31 and was returnable on August 30, tained those items recommended for by the Mechanical Division's limited ual business meeting in Chicago on e 25 and 26 (RL&C, July 1963, pages to 45). Results will not be known for e time.

Vhile many proposals for alterations in rchange Rules were relatively minor could be incorporated in the revision ently distributed by the Mechanical Di- on and effective in July, there were e which the Arbitration Committee mitted for formal vote:

ule 3, Section c, Part 1: New fourth agraph would prohibit cars having plers with 5- by 7-in. shanks in inter- nge service after January 1, 1968, be- se their performance has been unsatis- tory.

ule 3, Section i: New section would re- re structures of all cars built new, or re- lt after January 1, 1964, to be of such ngth that portions of car extending be- d the rails, preferably ends of body sters or side sills, can be jacked so as to nove trucks with the jacks in position.

Rule 3, Section t, Paragraph 3-f: New agraph would prohibit, after January 1, 56, use of certain truck side frames on s in interchange service which have rec- ls showing high incidence of failures.

Among the AAR specifications, location angle cocks on cars of exceptional length l the proposed specification for special shioning devices have been the subject of ter ballot. The growing number of cush- ed cars has led the Division to prepare ndards for mechanical characteristics, rdiness and testing. They cover all ar- ngements which incorporate travels in ex- ss of 5 in., thus excluding those cars hav- conventional draft gears. The cushion- device, for AAR test, must be installed a 70-ton box car. Allowed to roll freely, will be subjected to impacts of a striking r in 2 mph impacts until a 500,000-lb upler force is developed. This will rate shioning capacity. A similar series of its, with the cushioned car backed up by her cars, will rate the load-carrying ca- city of the car. These tests will proceed

in 2-mph increments until a coupler force of 1,250,000 lb is achieved.

Revisions of the Wheel and Axle Manual are numerous. One spells out the method for determining whether roller-bearing freight-car axles are bent, an inspection required after derailments, by swinging axle between lathe centers. Another sets the journal finishes for these axles. Included are: journal finish when ground, maximum 63 microinches; journal finish when turned before rolling, maximum 63 microinches; journal finish after rolling, maximum 16 microinches; dust guard seat finish when turned before rolling, maximum 125 microinches; dust-guard seat after rolling when used with a rubbing seal, maximum 16 microinches. Taper on journals must not exceed 0.001 in. Another requirement is that a file must not be used on journal surface or fillets but may be used to break edges at the end and dust-guard seat.

May Shows Improved Journal Performance

The 1,144,186 miles per hot box set off averaged by all U.S. and Canadian railroads in May 1963 was the best in the first five months for which figures are now available. AAR Mechanical Division figures show that cars involved in these set-offs included 2,342 with lubricator pads and 125 with waste packing. The total of 2,467 hot-box set-offs between division terminals represented an improvement of just 335 from 1962. In May 1958, there were 14,783 set-offs. In May 1953, there were 17,325.

Among devices from which AAR approval for test has been withdrawn is the Optimum journal lubricator with welded locks. The Mechanical Division has required that devices for which there is no longer approval shall be removed from interchange cars whenever they are found. However, F. Peronto, executive vice chairman, has advised that the Chesapeake & Ohio, which operates over 8,000 cars with the Optimum lubricator, is taking responsibility for continuing to operate them. They are to be repacked only when the 30-month repack period has expired; not at any other time. Mr. Peronto pointed out that despite the excellent performance of the device, its design involves the application of additional appurtenances to the journal box which do not comply with the AAR standard. He said that consideration would also be given to any other requests that might be received for continued use of the Optimum lubricator.

Car Orders

Orders for new freight cars in July 1963 totaled 43,056—up over 1,200 from July 1962. Deliveries were 4,017, with 3,016 of these coming from carbuilders' shops, the American Railway Car Institute reports. The backlog of cars on order and undelivered on August 1, 1963, was 9,646 in railroad shops and 12,279 in the shops of contract carbuilders—a total of 21,925. This backlog is over 8,700 cars more than on August 1, 1962.

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following page 60.)

53. SOLVENT CLEANER. Bulletin F11587 tells about Oakite 118 for cleaning electric motors, switches, and other surfaces where water should not be used. Oakite Products, Inc.

54. CHEMICAL RESISTANT COATINGS. General information and application data given on chemical abrasion, water and acid resistant coating systems given in Chemical Resistant Coatings Bulletin 6[illegible]. Rust-Oleum Corp.

55. ADHESIVES. Bostick Catalog identifies and describes over 50 industrial adhesives and primers for bonding metal to plastics, plastics to plastics, rubber to rubber and other applications. United Shoe Machinery Corp.

56. WATER BALANCING VALVE. Bulletin BLV-100B describes Illinois dual-purpose hot/chilled water-balancing valve with built-in "memory" device. American Air Filter Co.

57. AFTERCOOLER/AIR DRYERS. Bulletin A37-3 describes construction and operation of nine combination aftercooler-dryers having capacities to 283 cfm at [illegible] psi. Charts for sizing included with a dew point graph. Binks Manufacturing Co.

Advertisers Index

The most perfectly balanced cat? A PUMA

The most perfectly balanced wheel? A GRIFFIN

Few living things can match the smooth movement of a puma on the track of a terrified deer. Few man-made things can match the smooth movement of a Griffin® Wheel on the track of any railroad. The reason is simple: both are *perfectly balanced.*

Griffin EQS® Wheels are dimensionally accurate in every section. They're absolutely round . . . cast in balance to *stay* in balance. Distribution of steel is consistently even; tolerances are normally within five-thousandths of an inch. This is important, because unbalanced wheels ride rough, slap the rail, damage undercarriage components and lading.

And there are only two tape sizes, which simplifies wheel inventory problems. Next time specify Griffin.

GRIFFIN WHEEL COMPANY

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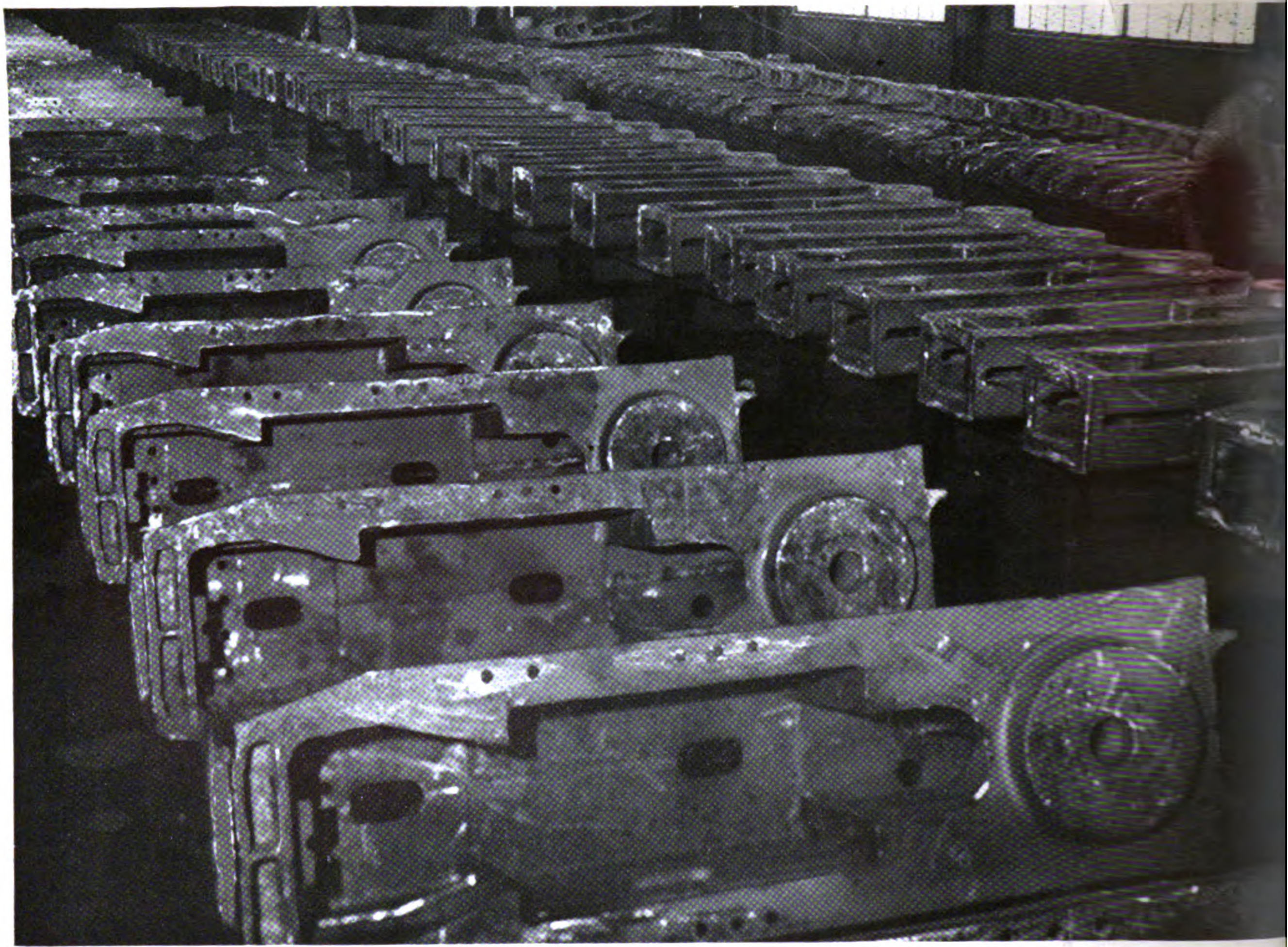

ILWAY
ocomotives
nd Cars

OCTOBER 1963

Mechanical Developments Have Major Role at ARP Exposition

A Simmons-Boardman
TIME SAVER Publication

Big Power, Big Cars page 37

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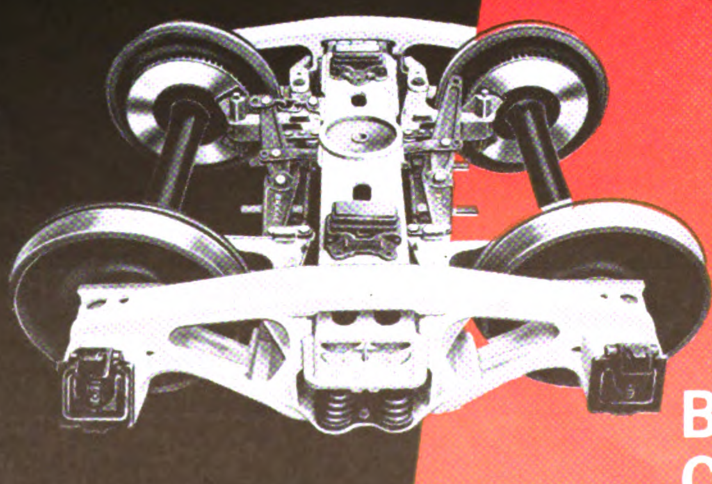
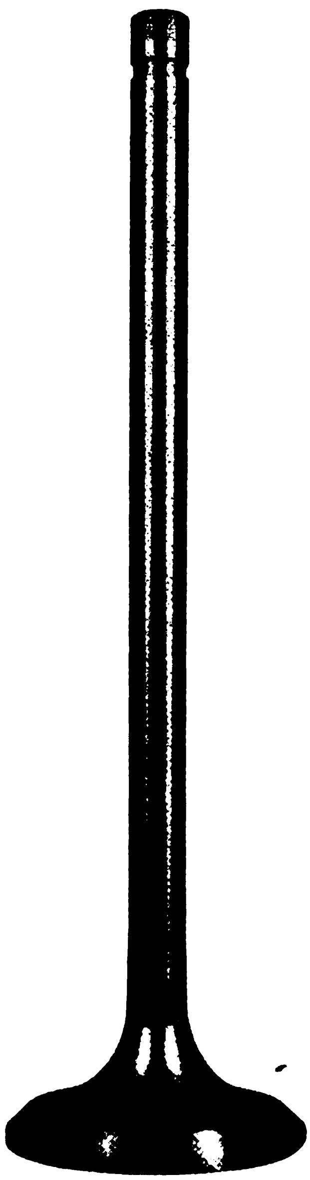
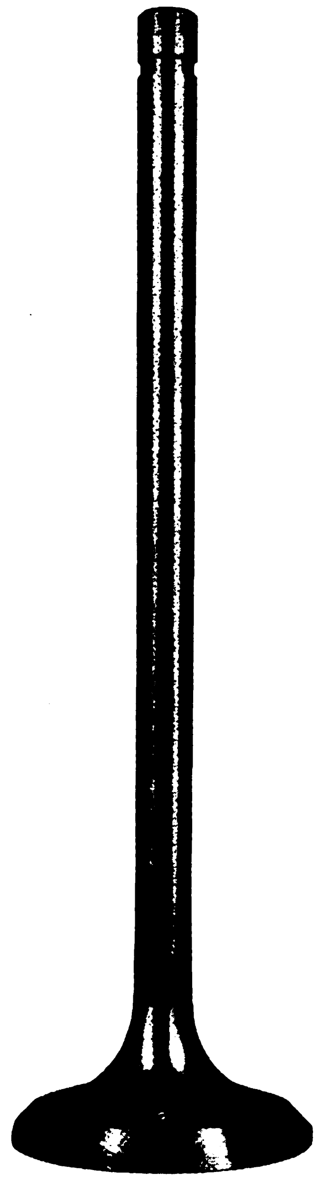


how much does a valve cost you?



$6.20...



or $66.00?

ALCO valve on the left costs $6.20. At the right—a :-alike "bargain" that can cost $66.00 in labor and erials if it fails prematurely. And the bill could go ıigh as $25,000.00—the cost of a complete engine ·haul—if the valve broke and dropped down into the ıpression chamber.

:oncl sion: first cost doesn't always indicate true : whe ı you're buying diesel renewal parts. Perform- e anc ·eliability count, too. Bargain-priced parts that pren ıturely cost you more.

ıLCO ıarts are always top quality, backed by a per- formance warranty and prompt, reliable service. ALCO's first responsibility is to its locomotive, so we don't try to cut corners by selling low-cost parts.

We're ready to serve you any time, with a complete line of parts stocked in strategically located warehouses. The next time you need renewal parts for your ALCO locomotives, contact your local ALCO representative. He's not selling bargains, but he'll save you money in the long run. ALCO PRODUCTS, INC.

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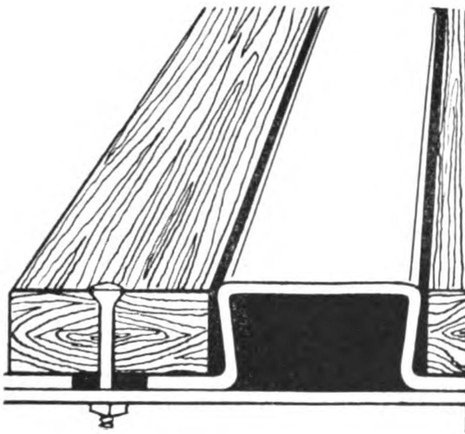
Rugged Armco Freight Car Flooring combines the strength of steel with the easy nailability of wood to give you long life and low maintenance.



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Armco Freight Car Flooring can efficiently meet these demands for Armco Flooring consists of alternate formed-steel ribs and treated oak pla Planks are supported by strong steel ribs and fastened with bolts. Because are welded to the underframe, Armco Flooring strengthens the gond structure.

Therefore, with Armco Flooring you get the strength, long-life and lo maintenance of steel *plus* the easy nailability of wood.

Economical Armco Flooring is easily installed. It reduces gondola-fl maintenance expense, too. "Composite steel and wood flooring will be us in gondolas," says one railroad official.

For further information about strong, low-maintenance Armco Freight C Flooring, just fill in and mail the convenient coupon. Armco will be happ discuss any usual or unusual car flooring requirement with you. **Metal Prod Division, Armco Steel Corporation, Middletown, Ohio.**

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America's Oldest Trade Paper
October, 1963—Vol. 137, No. 10

SAVING IDEAS FOR OCTOBER

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Report

Coordinated, AAR Meet In Chicago

Four days of meetings of specific interest to mechanical department men are scheduled during the American Railway Progress Exposition. On Friday, October 11, the AAR Mechanical Division will hold its annual meeting. The following week, October 14-16, the four Coordinated Associations—Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers—will convene. Problems and opportunities represented by the equipment and products on display at the Exposition will be featured in the discussions of all five organizations.

The meetings of all these groups will be at McCormick Place, about two miles Southeast of midtown Chicago. Free bus service is available from midtown hotels. McCormick Place has several meal service facilities with capacity for serving the large number attending the Railway Progress Exposition which involves not only the railroad industry's largest equipment exhibit, but also simultaneous meetings of most of the industry organizations.

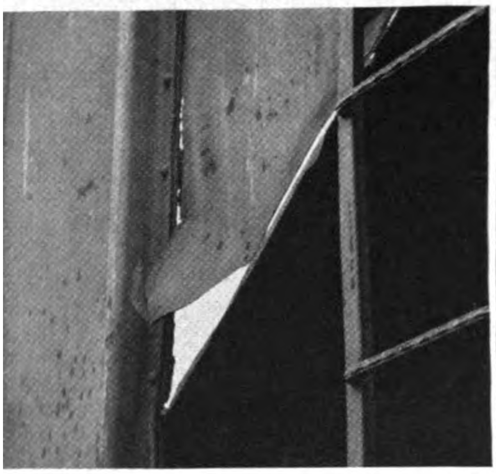
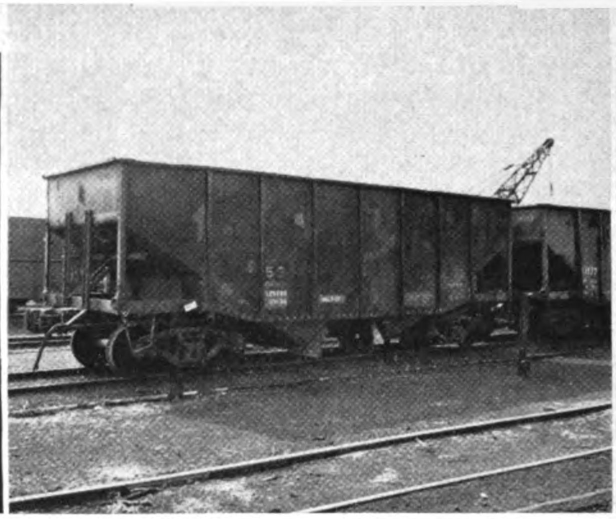
Even though no general meetings of the mechanical groups will be held at the Hotel Morrison in midtown Chicago, at Clark and Madison street, the hotel will serve as convention headquarters for all five of the mechanical department organizations.

Mechanical Division

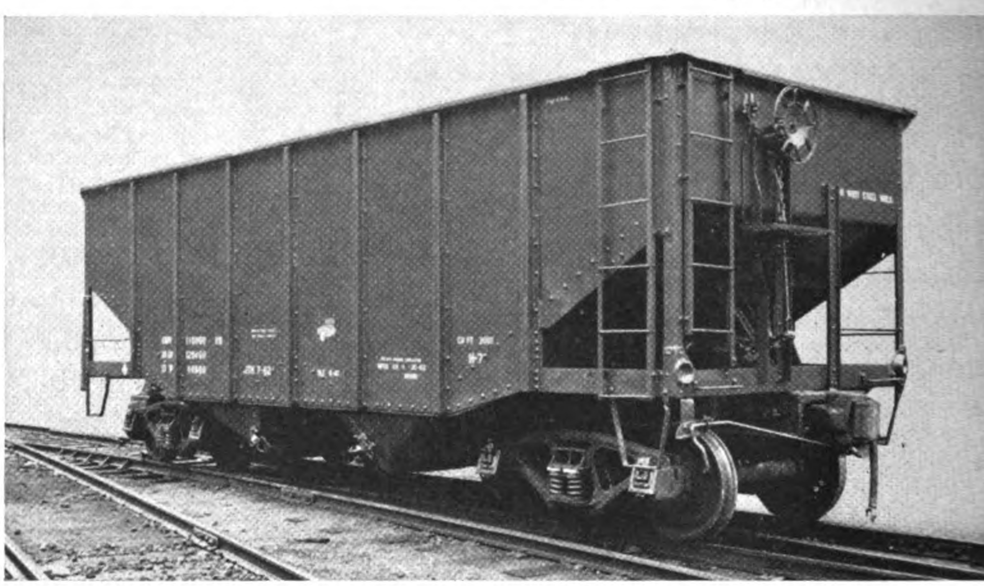
At the one-day annual meeting of the AAR Mechanical Division, made possible by a limited business session held earlier this year, there will be an address by A. E. Perlman, president of the New York Central, and three panel discussions. The meeting will convene at 10 a.m. in the Lakeside Room in McCormick Place, with Mr. Perlman discussing Industrial Engineering in the Mechanical Department. This address will be followed by discussions of three topics important in the design and maintenance of future rolling stock:

- The Ideal Design of Locomotive for Operation on the Average American Railroad. Moderator: P. J. Finch, assistant superintendent motive power-diesel, Chesapeake & Ohio. Representatives of all interested departments of the railroad industry, as well as those of the locomotive builders, will have an opportunity to set forth their opinions on the ideal locomotive from all viewpoints. This is to include the matter of maintenance which is of great importance to the mechanical departments and which, reportedly, is not always given consideration when new locomotives are being designed.
- Fundamentals of Car Design. Mod-

(Continued on page 10)


100 "tired" 50-ton hopper cars



re-bodied by Bethlehem

Skillful engineering gives cars many more years of service with low maintenance expense

Quite a difference in these cars, before and after the face-lifting they received at Bethlehem's car shops! And the re-bodying job cost less than you might think.

The ingenuity of Bethlehem's engineering group made possible the salvaging of many of the original components. In addition, the obsolete impact cushioning was replaced by a fixed standard AAR center sill, thus making the rejuvenated cars less costly to maintain. The cars should provide many more years of service.

The customer complimented Bethlehem's engineering and showed confidence in our workmanship by accepting Bethlehem standard inspection exclusively. We can do an equally satisfactory job on your "tired" freight cars, and will welcome the chance to prove it.

If you would like to take advantage of the new AAR ruling which permits a 5-pct rail-load increase, you can do this by having Bethlehem replace your worn-out 50-ton hopper-car bodies with new, enlarged bodies, suitable for carrying more than 7 tons of additional payload on your existing 50-ton trucks. Our engineers will be glad to explain our proposal for such an increased-cube car.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales: Bethlehem Steel Export Corporation*

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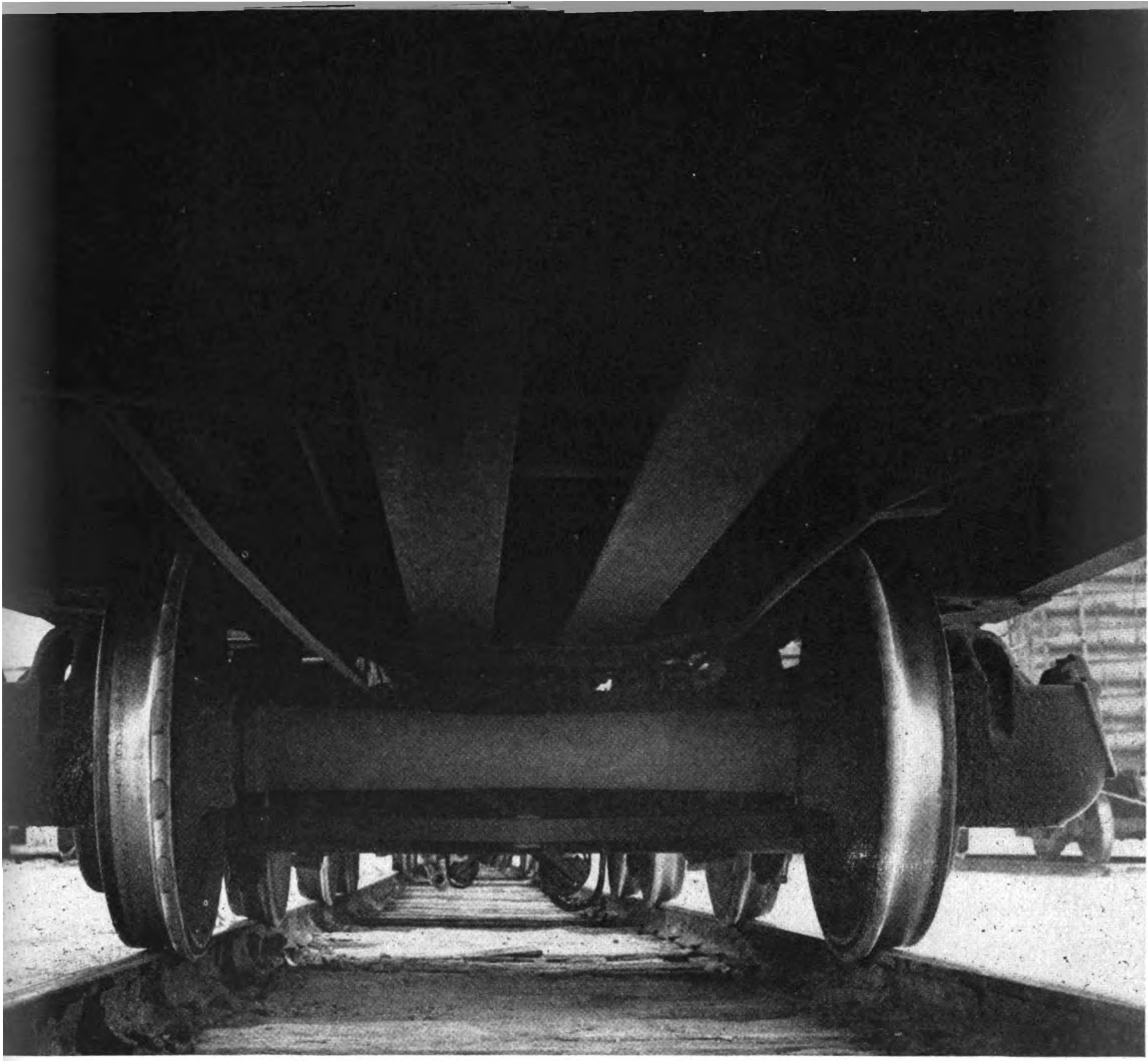
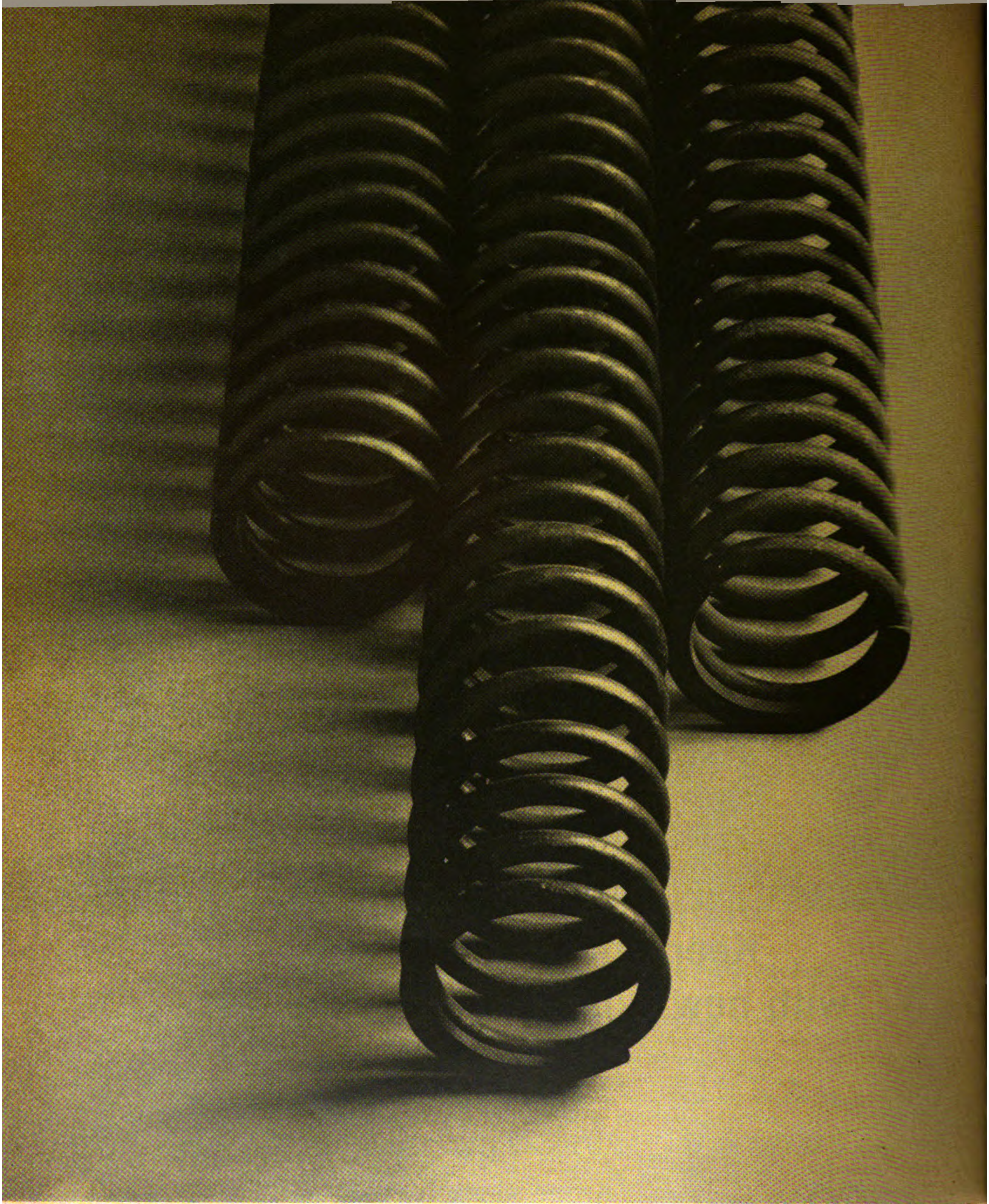
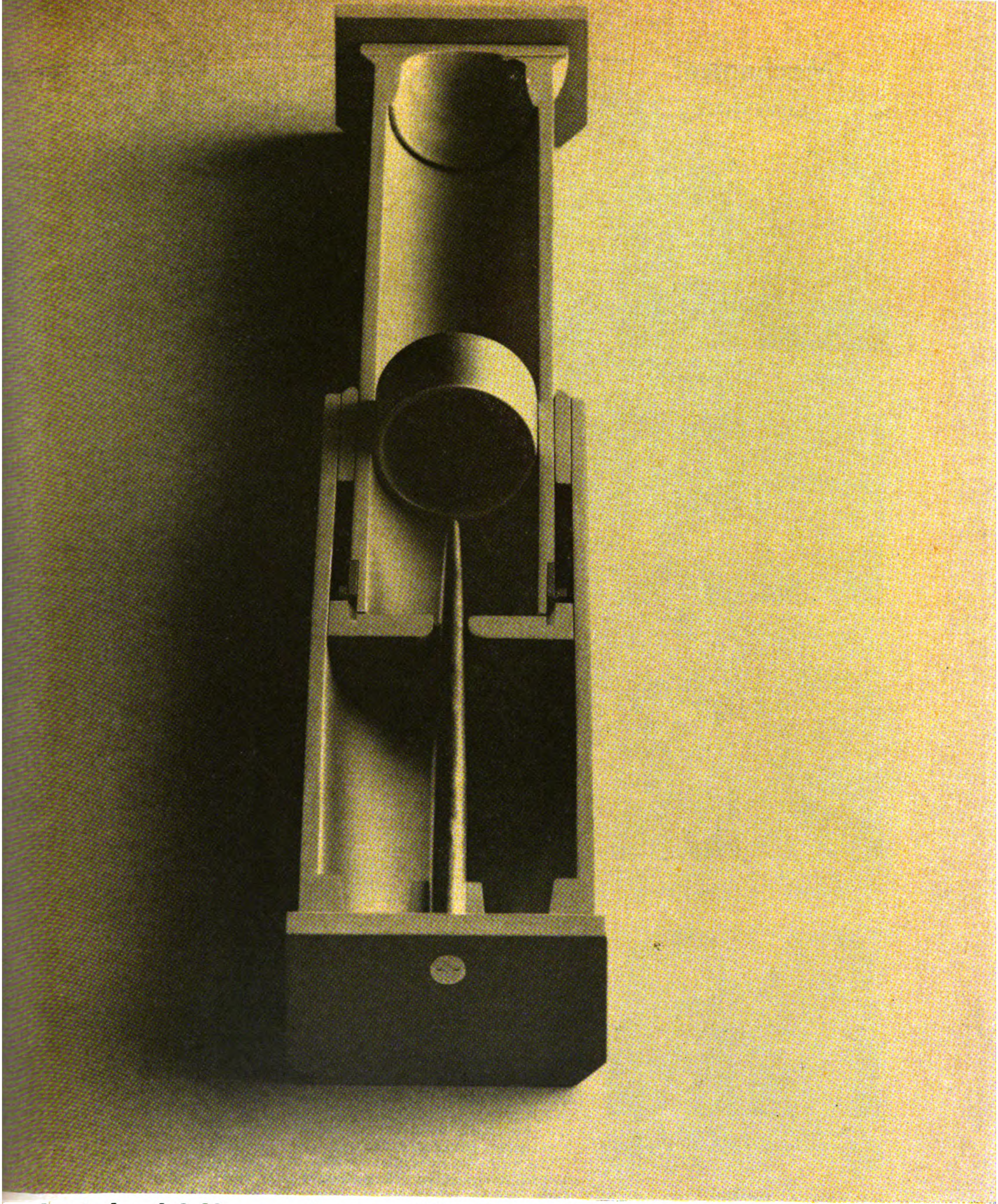




Other cushioning systems may need them...

Springs increase weight of cushioning systems by at least 200 lbs. Because of its advanced design, the ACF Freight-Saver eliminates this and other dead weight. In fact, with ACF Freight-Saver equipped cars, you can save as much as 1500 lbs. in comparison to identical cars equipped with other center-of-the-car sliding sill cushioning units having the same travel.

What is used in place of springs? The ACF Freight-Sa[ver] proven hydraulic-pneumatic cushioning system uses pressure for return. There are only four moving parts this dependable design. It serves you trouble-free, imp[act] after impact...year after year. You can count on cons[ist]ently lower maintenance costs.
Air pressure offers flexibility of return characteristics



but look! No springs with the ACF Freight-Saver

on between fixed and sliding sills is increased, easy tments can be made to compensate. Rather than drop nit and replace the spring, you simply increase the ressure.

system offers maximum versatility. ACF Freight-Savers available with 20 or 30 inches of travel in both direc-. They provide reliable protection for an extremely range of ladings.

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Mechanical Division

A. E. Perlman (NYC)
Speaker

W. M. Keller (AAR)
Moderator

P. J. Finch (C&O)
Moderator

N. A. Passur (SP)
Moderator

J. A. Welsch (IC)
Chairman

J. H. Heron (NYC)
Vice Chairman

F. Peronto, Exec.
Vice Chairman

F. H. Stremmel
Secretary

Meet In Chicago

(Continued from page 5)

erator: N. A. Passur, engineer car design and construction, Southern Pacific. The work of the special AAR Task Force will be discussed. This current activity of the Mechanical Division, which is involving railroads, carbuilders and suppliers of freight-car components, was recently called by a railroad spokesman "one of the most significant things the AAR has ever done."

• Automation in the Railroad Industry, including Automatic and Semi-Automatic Train Operations. Moderator: W. M. Keller, vice president, AAR Research Department. Recent developments in Canada and abroad are expected to be discussed. It is also understood that a film taken by the railroad group which recently visited the new high-speed Tokaido line of the Japanese National Railways will be shown.

J. A. Welsch (general superintendent motive power, IC) is the current chairman of the Mechanical Division; J. H. Heron (assistant vice president-equipment, NYC) is vice chairman; F. Peronto is executive vice chairman, and F. H. Stremmel is the secretary.

Coordinated Meetings

The Coordinated Associations will convene at 10 a.m., Monday, October 14. The meeting rooms in McCormick Place for these groups are: ABA—Room 10; CDOA — Room 12; LMOA — Banquet Room; RF&OOA — Room 11. Following their opening activities, all groups will adjourn to the Arie Crown Theater for an address. Speaker at this 10:50 a.m. joint session will be Fred Korth, Secretary of the Navy. The Coordinated groups will be joined by members of the Roadmasters and Maintenance of Way Association whose annual meeting is scheduled concurrently.

First technical sessions of each of the Coordinated groups will follow at 2 p.m. on October 14. The annual Coordinated Associations luncheon will be served on Tuesday, October 15, in McCormick Place. W. H. Kendall, president of the Louisville & Nashville, is to be the speaker. His railroad has been active in introducing new freight equipment and motive power in recent years. The L&N was also one of the first operators of unit trains for rapid, economical movements of bulk materials. No meetings are scheduled following the luncheon so that members may visit the exhibits in McCormick Place and at the nearby Illinois Central 31st Street yard.

Activities of the four groups, detailed previously (RL&C, August, p 46), are arranged under the direction of T. T. Blickle (general manager-mechanical, Santa Fe) who serves as chairman of the Committee of the Coordinated Associations. Presidents of the individual organizations are: ABA—J. H. Russell, superintendent air brakes and steam heat equipment, New York Central; CDOA—C. W. Kimball, chief of car inspection, Southern; LMOA—C. A. Love, chief mechanical officer, Louisville & Nashville; RF&OOA—L. H. Leikel, road foreman engines, Baltimore & Ohio.

The Air Brake Association program lists the following topics: Third Generation Brake Cylinder Release Valve; Conversion Features of ABC-1 Valve; Better Brakes for Freight Cars; Automated Rail Operations; Air Brake Instructions for Repair Tracks; Reappraisal of Piston Travel Limits; Locomotive Air Compressor Synchronization; Air Compressor and Fan Drive Equipment; Performance of Gasket Material at Sub-Zero Temperatures; Time Saving Methods for Air Brake Maintenance.

Coordinated Associations

W. H. Kendall (L&N)
Speaker

T. T. Blickle (ATSF
Chairman

J. H. Russell (NYC)
President ABA

C. W. Kimball (So.
President CDOA

C. A. Love (L&N)
President LMOA

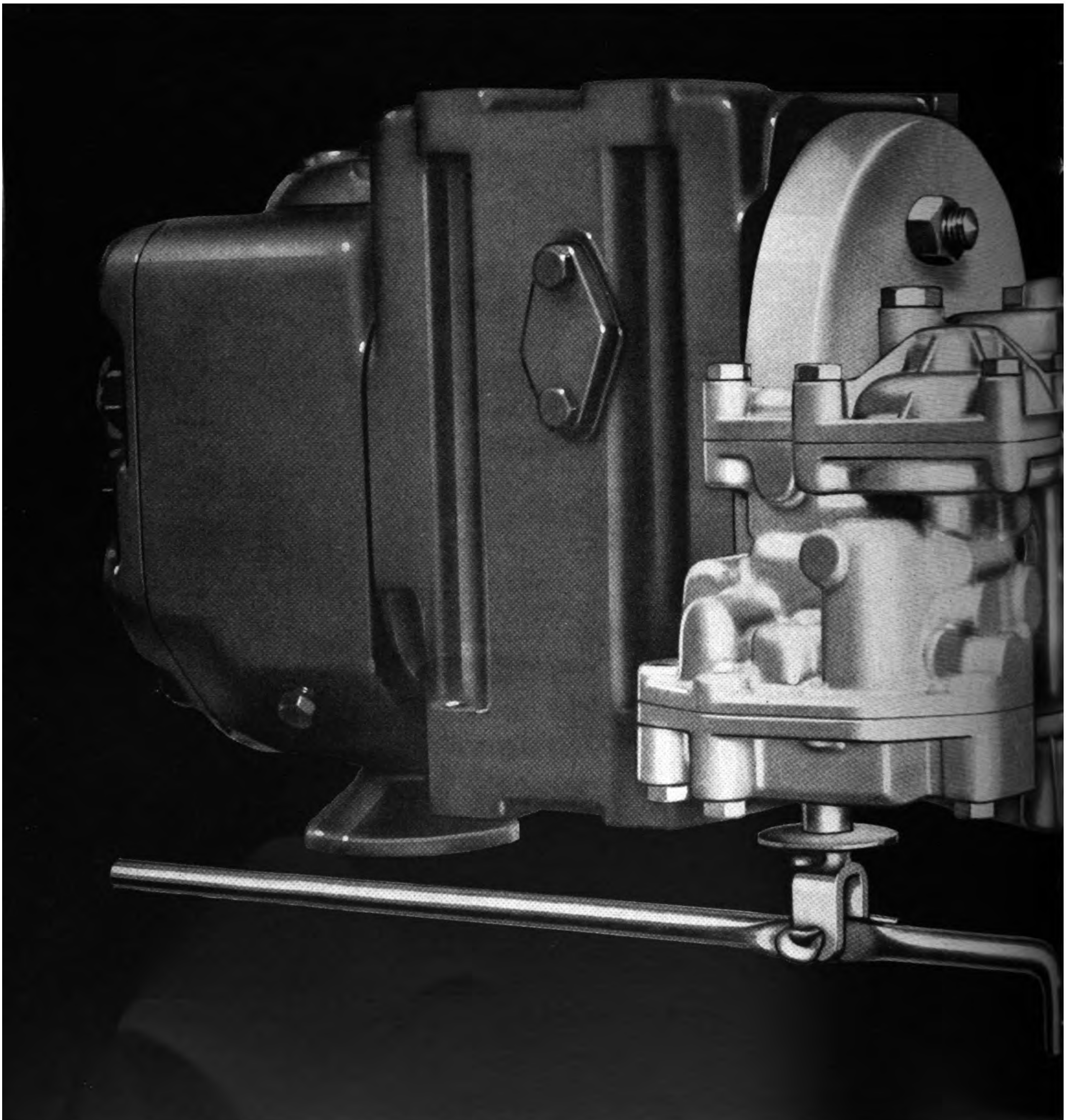
L. H. Leikel (B&O
President RF&OO-

Car Department Officers progra include presentation of following rep AAR Loading Rules; Road-Rail Trans tation; Interchange and Billing for Re Light Repair Track and Train-Yard O tion; Freight and Passenger Car Eq ment; Car Lubrication; Wheels, Axles Wheel-Shop Practices; Maintenance Servicing of Mechanical Temperature C trol Systems; Painting.

Locomotive Maintenance Officers is devoting the entire program to h horsepower locomotives, lists the follo topics: Mechanical Maintenance; Elec Maintenance; Fuel and Lubricating Analysis of Engine Maintenance; Sho cilities Required; New Developments ganization and Responsibilities of Loco tive and Stores Departments.

Railway Fuel and Operating Officers gram will involve following topics nomical Distribution of Power; Train dling; Terminal Delays and Yard O tions; Education and Training of E men; Diesel Failures and Steam Gen Troubles.

(TURN TO PAGE 96)

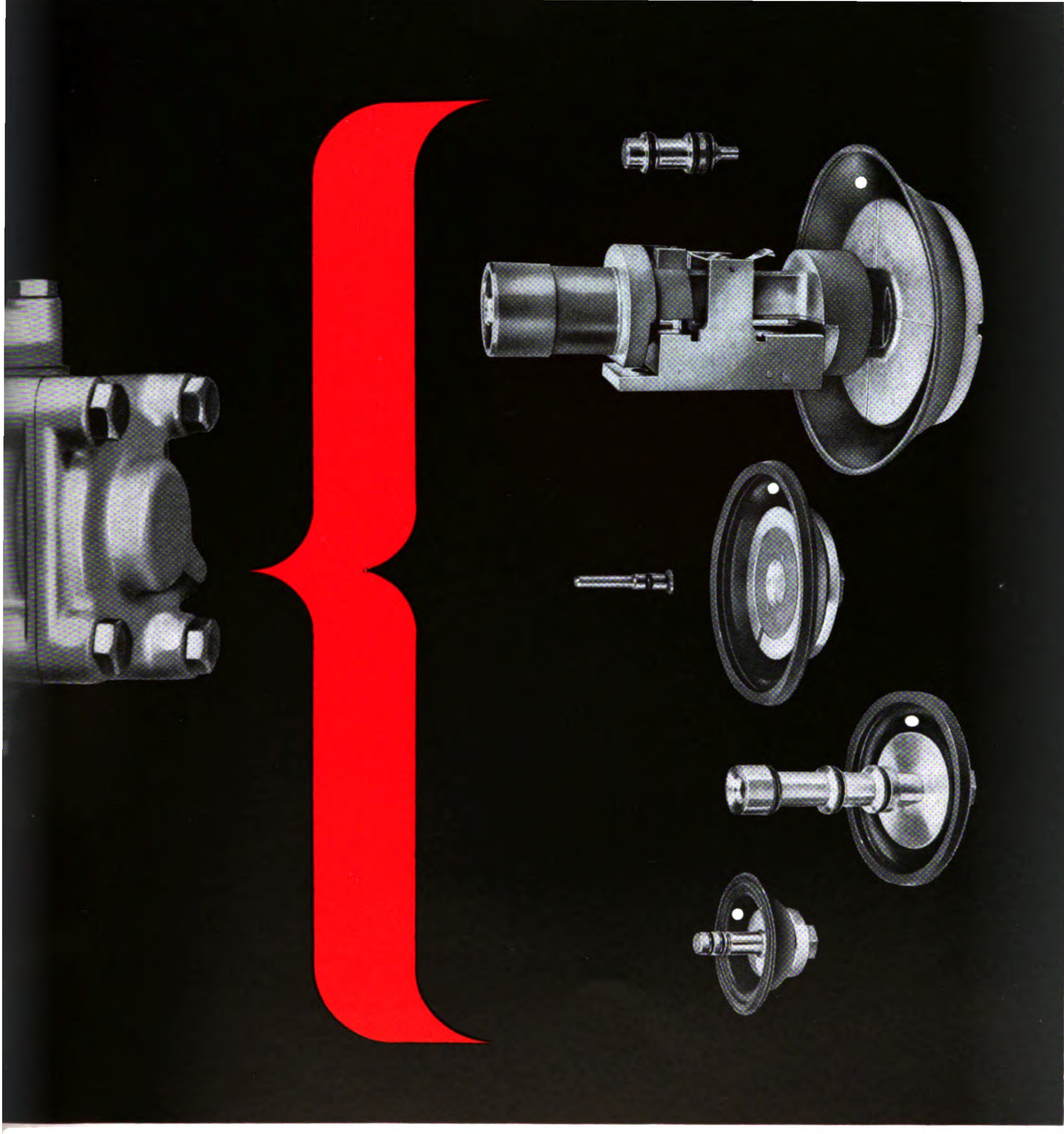


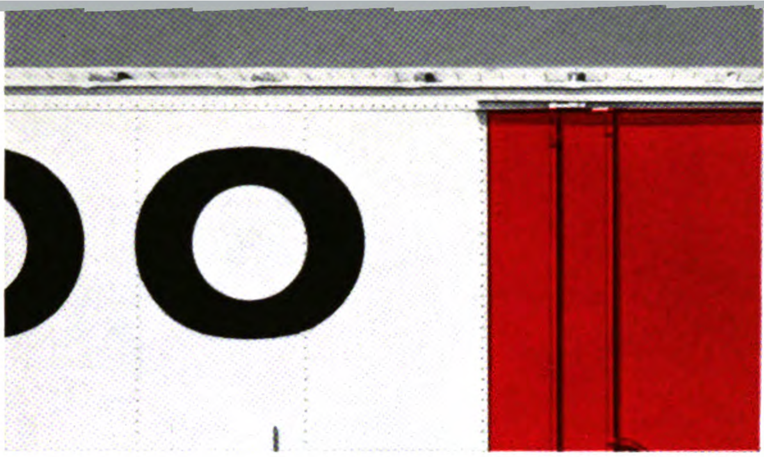
THE ABD-1 VALVE provides

Diaphragms and "O" ring seals in the service portion of the new ABD-1 freight control valve eliminates costly wear and fitting problems. Close tolerance metallic pistons and their potential leakage and maintenance problems are gone. Maintenance is simple—No special skills are required.

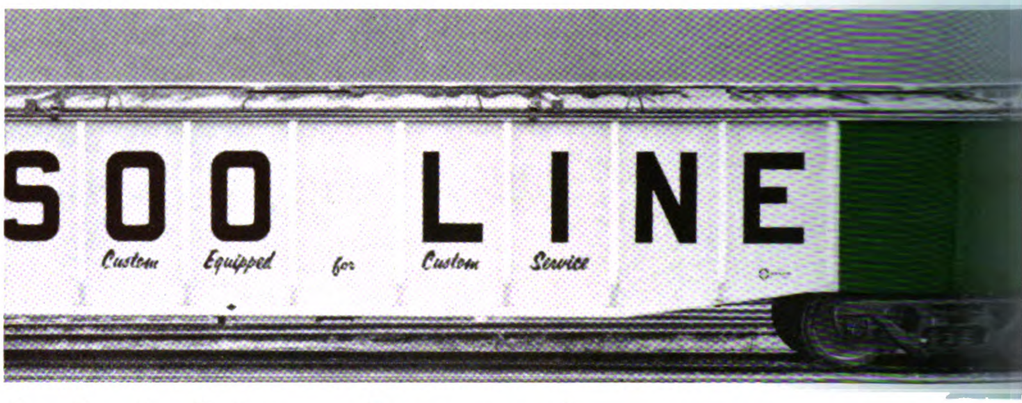
The new ABD-1 Valve consists of a vertically-mounted, diaphragm-operated service valve, an integral brake cylinder **release valve,** and an accelerated service release **feature. Valves** with these same features have **been in heavy duty freight** service over six years and **show reliable and consistent** operation greatly in **excess of the present C.O.T.&S.** period. Because the **service piston is** vertically mounted, vibrations **have little or no effect.** The accelerated release **allows running release** at low

mounte.

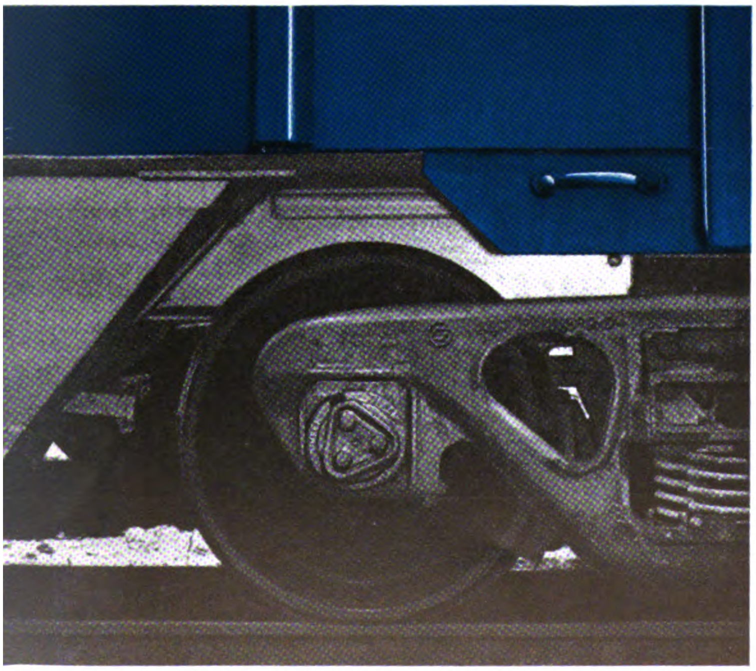




The new Soo . . .



is bright and smart . . .



right down to its roller bearings

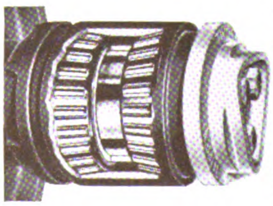
The Soo Line Railroad Company has a bright new outlook. It's reflected in the new colors used for identification on specialized freight cars.

But color isn't the only thing new about this equipment. These cars are new right down to the axles, which roll easily and trouble-free on Timken® "AP" tapered roller bearings.

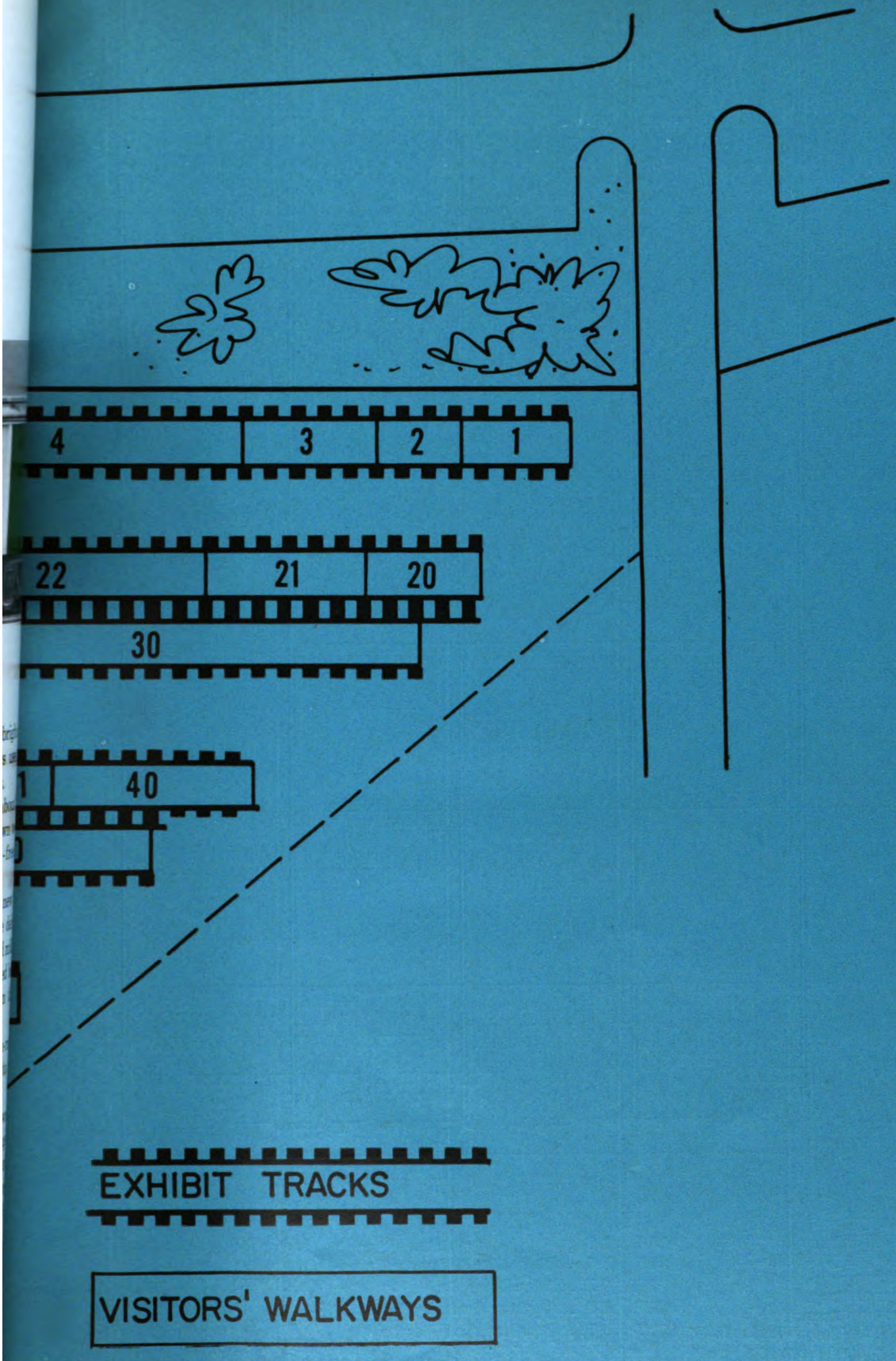
Timken tapered roller bearings on the new Soo cars will help speed freight and eliminate delays. Timken bearings average over one-hundred million miles between car setouts due to overheated bearings. And they cut terminal inspection time drastically. Save on lubricant, too.

Timken heavy-duty bearings are precision-made from nickel-rich steel and they're tapered to roll the loads in rugged railroad service.

That's why 128 railroads and private car owners now have over 121,000 cars on Timken bearings in service or on order. The Timken Roller Bearing Company, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Rock Bits.



QUALITY TURNS ON HEAVY DUTY
TIMKEN®
TAPERED ROLLER BEARINGS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20
30
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EXHIBIT TRACKS
VISITORS' WALKWAYS

Track

American Railway Progress Exposition—Combined Railway Suppliers Exhibit—Illinois Central 31st Street Yards, Chicago, Oct. 9-16, 1963.

Exhibits

49	Aeroquip Corp.
83	Air Bulkhead Car Corp.
21	Alco Products, Inc.
64	Aluminium Ltd. Sales, Inc.
6	Aluminum Co., of America
31, 43	American Car & Foundry
60, 90	American Steel Foundries
24	Apex Railway Products and A. O. Smith
87	Archer Daniels Midland Co.
32	Automatic Retailers of America
62	Bethlehem Steel Co.
A	Buckeye Iron & Brass Works
33	The Budd Co.
47	Buffalo Brake Beam Co.
10	Caterpillar Tractor Co.
46	Cleveland Graphite Bronze, Div. of Clevite Corp.
34	Dana Corp.
88	Dempster Bros.
A	Dorsey Trailers
63	Doweloc Div., D. B. Frampton
25	Electro-Motive Div., General Motors Corp.
84	Enterprise Rwy. Equip. Co.
82	Evans Products
30, 40	General American Trans. Corp.
52	General Electric Co.
1	General Steel Industries, Inc.
65, 66	Greenville Steel Car Co.
73	Hyatt Bearings Div., General Motors Corp.
81	Hydra-Cushion, Inc.
86	International Steel Co.
20	Keystone Rwy. Equip. Co.
71	Koppers Co., Inc., W. P. Div.
72	Landreth Industries
42	McLean-Fogg Lock Nut Co.
2	W. H. Miner, Inc.
48	Minnesota Mining & Mfg. Co.
61	National Castings Co.
45	National Steel Corp.
4	North American Car Corp.
A	Page & Page Co., Div. of Dura
A	Pak Mor
A	Pitman Mfg. Co.
53	Plasser Rwy. Maintenance Corp.
74	Preco, Inc.
5, 23	Pullman-Standard-Trailmobile-Transport Leasing
68	Quaker City Railroad Sales
A	REA Leasing
26	Reynolds Metals Co.
7	Sparton Rwy. Equipment
3	Standard Car Truck Co.
9	Strick Trailers
49-A	Thermex Metallurgical
67	Thermo King Corp.
50	Thrall Car Mfg. Co.
8	Transco, Inc.
44	Unarco Industries, Inc.
51	Union Tank Car Co.
70, 80	United States Steel Corp.
41	Westinghouse Air Brake Co.
75	Whitehead & Kales Co.
A	The White Motor Co.
85	Whiting Corp.
22	Youngstown Steel Door Co.

Exhibitors and space assignments as of Sept. 20, 1963

What's New in Equipment

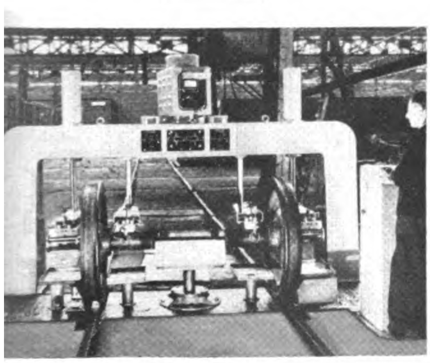
roducts of Exhibitors—1963 American Railway Progress Exposition

Not previously described in Railway Locomotives and Cars

ackage Brake

package brake unit which may be applied existing or new trucks incorporates a ıgle bolster-mounted pneumatic cylinder. ›rces are delivered through a simplified verage system to standard brake beams. ›vers and rods are of conventional design. rake shoes of any material or friction vel may be utilized with the unit. The linder is bolted to the bolster along with slack adjuster which may be either of the anual or automatic type. The push rod ıs a spherical end which rests in the coniıl outer end of the piston, compensating ›r misalignment between the spring-ounted cylinder and the unsprung lever stem. The brake, it is said, could be ›plied to practically any car now in service. merican Brake Shoe Co.

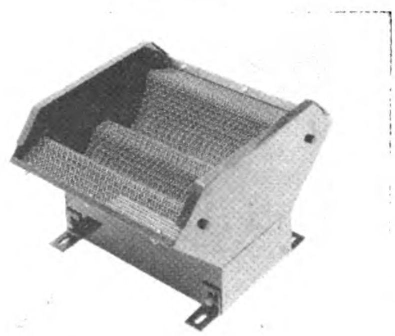
For more information, circle 10-1 on ırd following page 100.



law Detector

he Ultrasonic Flaw detector, its two com-ination probe sets, and the two monitors onnected to it are mounted on a gantry /pe support, together with the indicator anel for displaying test results. The axle f the wheel set to be tested initially has s journals and areas on both sides of the heel hubs cleaned so probe sets make ood contact with these surfaces. The wheel et is then rolled under the support where is stopped when over the electro-mechan-ically controlly jack which lifts it at the enter of the axle so that the journals and heel seats come to rest against the com-ination probe sets mounted on gimbals. The friction wheel of the drive unit mounted at one side is pressed pneumatically against the rim of the right wheel, while the rim of the left wheel revolves against a pair of counter-pressure rollers. This drive is powered by a geared motor. A liquid is pumped to each probe and, during testing, drips into catch trays mounted underneath, from where it is recirculated by the pump. The test equipment is operated from a switchgear cabinet, the top of which forms a control desk where controls and indicators are located. The unit is said to speed and make possible a more thorough inspection procedure. Krautkramer Ultrasonics, Inc.

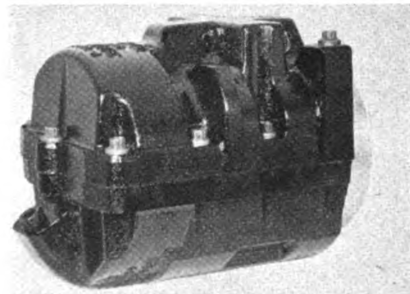
For more information, circle 10-2 on card following page 100.



Spark Arrester

During throttle or load changes in train operation, the Super Spark Arrester is said to break and sift particles entrapped in the mesh openings, eliminating the clogging problem. Filtration effect is the same as rigid mesh. As high output is reached the element is stopped, secured and sealed by the top flanges. The open area around the manifold outlet serves as a venturi to eliminate engine-room gases. Tests are said to have proved the arrester, which is available for all makes and models of locomotives and conversions, does not create exhaust back pressure. Super Co.

For more information, circle 10-3 on card following page 100.



Journal Bearing

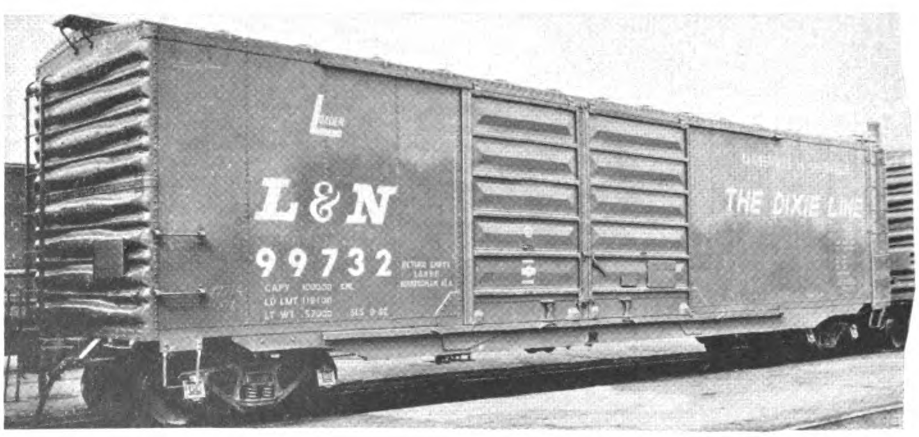
The 100-ton Clevite cartridge journal bearing is of the same design as the 70-ton Clevite models. It can be adapted to an AAR standard 6½ x 12 roller-bearing type axle and applied to new or existing freight cars. Its safety factor is four. When a 100-ton car is fully loaded, the cartridge bearings are loaded to only 25% of capacity. Clevite Corp.

For more information, circle 10-4 on card following page 100.

Diesel Overhaul Tools

The Model PVG-28 eccentric valve-seat grinder, and adaptation of the PVG, is designed to meet the demands of diesel-engine overhaul shops for precision, finish, economy, and speed of operation.

A vacuum-method for testing valve assemblies in repaired diesel engines utilizes the Model VSVG valve-seat vacuum gauge. The gauge is said to indicate the true degree of accuracy in the valve-seat assembly by



Lengthened Box Car

The 50-ft 6-in. box car has been upgraded and lengthened from 40 ft 6 in. in Louisville & Nashville shop, using parts regularly available from Parts and Service Division for such "stretching" operations. L&N rebuilt a large number of cars in this way. Pullman-Standard.

For more information, circle 10-5 on card following page 100.

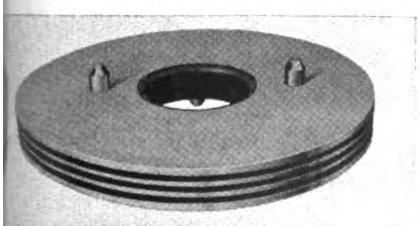
icating, in inches of vacuum, the seal t exists between the valve seat and valve e, eliminating the need for valve-seat-dial icating, blue-in tests, or other inspection thods. Hall-Toledo, Inc.

For more information, circle 10-6 on d following page 100.

e Down Devices

ner casting bolsters for handling con- ers up to 40 ft in length are tied down he cushioned rub rails on the G-85 flat illustrated. Using a jack, one man can e the 8-ft bolsters from their storage ations in the center sill. Also available installation in the cushioned rub rails tie downs for shipping highway trucks. series of pockets in the rail makes sible the location of tie downs at any nt along the length of the car. The ck-absorbing feature of the cushioned rails allows 8 in. travel in either di- ion. General American Transportation rp.

For more information, circle 10-7 on d following page 100.



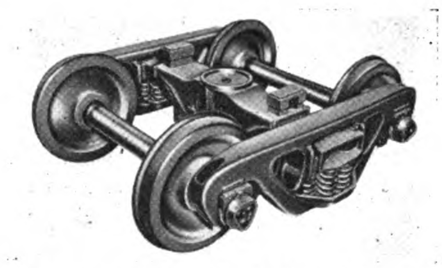
enter-Plate Bearing

laminated elastomeric bearing for car ter-plates, on test with two major rail- ds for several months, is designed to ninate galling and reduce turning torque. is, it is said, will end the need for lubri- ion and reduce periodic maintenance. w lateral forces on wheel flanges and rnal bearings when the trucks turn are o reported. Lord Manufacturing Co.

For more information, circle 10-8 on d following page 100.

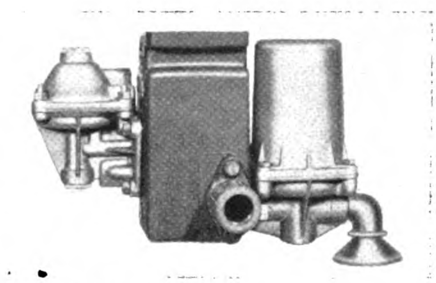
eight-Car Truck

o bolsters and rubber pads control lat- l motion on the ASF Ridemaster truck. rtical motion is controlled by Ride Con- l friction elements. Constant contact e bearings maintain steady control of



truck movement and carbody stabilization at speeds up to 100 mph. In trial runs on a test train, the number and intensity of lateral shocks inside a freight car are said to have been reduced ten times compared with conventional trucks. American Steel Foundries, Inc.

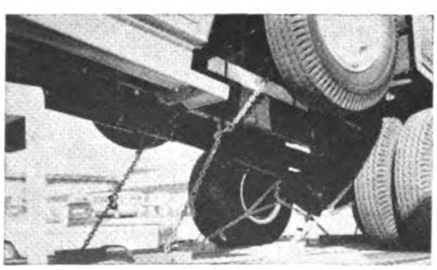
For more information, circle 10-9 on card following page 100.



Relay Valve

The additional and continuous local venting of the Wabco A-1 reduction relay valve during a brake application is said to compensate for the increased brake-pipe volume on freight cars up to 100 ft in length. Each valve is tuned so that the long cars will have the same or better brake application time than short cars. With solid or mixed trains of long cars equipped with the new valve, brake application, it is said, will be much faster and slack action because of a delay in brake application is eliminated. On a 75-car train of 100-ft cars, brake application time, it is said, is cut in half. Westinghouse Air Brake Co.

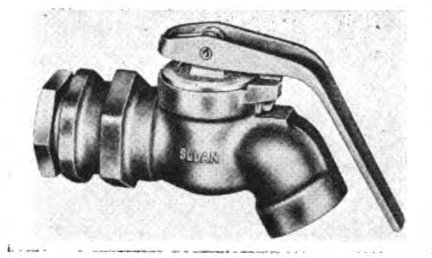
For more information, circle 10-10 on card following page 100.



Truck Tie-Down

Transportation of highway trucks on piggyback cars is being facilitated by the Heavy-Duty Tie-Down equipment which makes possible fast securement on the car without costly, expendable dunnage. It also permits quick unloading at destination. The winch-drum design and method of attaching the chain allows a quick change of chain without removing the winch from the anchor channel. Winches may be moved to any desired position without removing and re-applying bolts. Brandon Equipment Co.

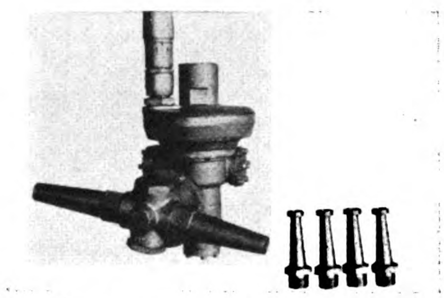
For more information, circle 10-11 on card following page 100.



Angle Cock

A synthetic rubber seal held against a cast-brass ball by a spring washer automatically compensates for wear and maintains a positive seal in the redesigned Sloan-Caco brake-pipe angle cock. The cock, with its compression fitting, can be assembled to accommodate either an unthreaded or threaded air pipe. It has AAR approval for limited interchange service. Sloan Valve Co.

For more information, circle 10-12 on card following page 100.



Tank Cleaning Unit

The Oakite 621 tank-cleaning unit may be suspended in tanks by hose or piping. It is constructed of brass and stainless steel, weighing approximately 30 lb. It is actuated by an air motor. The spray head makes one horizontal revolution every 15 min, and the nozzles rotate in a vertical plane at 20 to 30 rpm. The unit may be had with a choice of nozzles and a manhole cover, if desired. Oakite Products, Inc.

For more information, circle 10-13 on card following page 100.

Performance Recorder

An electronic system, Lodar, measures numerous mechanical functions of locomotives during road service. The system, designed to increase operating efficiency, consists of a 45-lb recorder, tape magazine assembly, a centrally located data reduction unit, and multi-channel strip chart paper recorder. Seventy-two Lodar recorders on a major Southern railroad check locomotive acceleration and deceleration, speed, transition stage, dynamic braking, traction power, throttle position, indepen-

(Continued on page 27)

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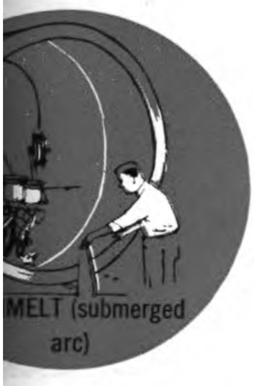

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on track and rolling stock.
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OXWELD service is built on 55 years of LINDE experience with acetylene, atmospheric gases, and welding equipment. The extensive field staff of the OXWELD Railroad Department is backed by continuing research by LINDE laboratories, and can also provide other material made by UNION CARBIDE such as plastics, chemicals, metals, along with advice on their application.

OXWELD equipment, with the widest variety in its field, is available to you at almost any time through your local OXWELD representative who serves railroads exclusively. If you wish him to call, or need any information about LINDE welding and cutting equipment, manual or mechanized, write Union Carbide Corporation, Linde Division, Oxweld Railroad Department, 270 Park Avenue, New York, N. Y. 10017; or 230 N. Michigan Avenue, Chicago, Illinois 60601.

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OXWELD Railroad Department

UNION CARBIDE **LINDE DIVISION**

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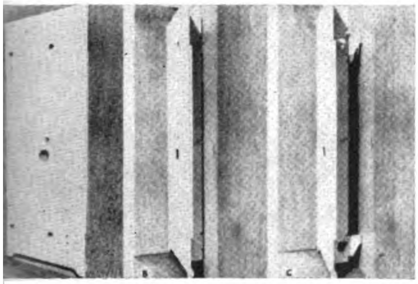
(Continued from page 23)

ıt brake pressure, and train-brake pres- ɛ (RL&C, Sept. 1962, p 59).

-odar can also determine the consump- ı of fuel and electric power. Informa- ı on the causes of train malfunction can developed, and it can anticipate mechan- . problems so that malfunctions can be ɪided. Through pressure transducers and er electronic components, the recorder ɛives analog information, converts it to ɛn-bit binary code, and stores the data permanent, fireproof metal tape. Each l of tape can record up to 50 hours of ɔmotive running time. When recording ɔmplete, the tape magazine is removed m the recorder and taken to the data re- :tion unit where it is converted into a ɪtinuous analog record, printed either the multi-channel strip chart paper or decimal form. Power for the recorder, sensors and electronic components is ɪplied by the locomotive's 64-volt battery. ɪial installation of components, piping l cables in the locomotive takes four to hours. Connectors and fittings permit recorder to be installed or removed ɪidly. Litton Industries, Inc.

For more information, circle 10-14 on d following page 100.



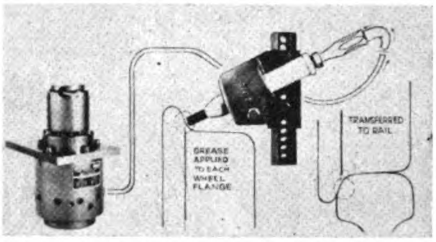
ɔad Divider System

ɪe man, it is said, can completely adjust full car complement of Type STA side ers in less than two minutes. The panels the three-position wall system swing tward to reduce inside width of 112-in. 104 in. Further extension reduces width 99 in., or the system can be installed to 'e alternate car-width positions—105 and 0 in., for instance. The filler can be ex- ɪded and locked after the load is in place, unlocked and retracted before load is noved. To operate, a pin is released, the nel swung outward, and integral hook- :k snapped. The system is designed to ɪrk in conjunction with the Split-Bulk- ad load divider. Unarco Industries.

For more information, circle 10-15 on rd following page 100.

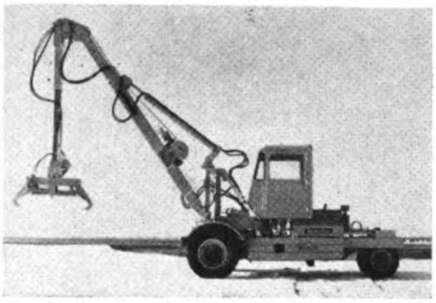
ange Lubricator

ɪe Burrell flange lubrication system auto- ɪtically provides continual grease prog- ssion from flange to rail. Lubrication ɪplied at 10 points (two center plates and ur lead wheels in both forward and re- rse) is said to reduce rail and flange wear, ɪwntime, wheel squealing and climbing :railments. The result is said to be less el used, increased speed or more tonnage



moved. Burrell No. 401 molybdenum-disulphide grease is automatically applied to lead wheel flanges of each truck. Burrell Flange Lubricator Co.

For more information, circle 10-16 on card following page 100.



Hydraulic Crane

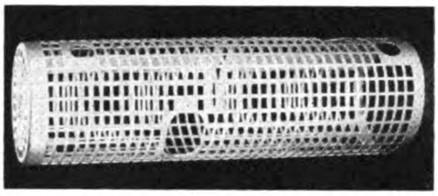
Clamps are automatically positioned on wheel sets by rotation of Wheelset attachment controlled from the operator's seat on the automatic railroad Wheelset carrier. Load is raised and lowered with the cable hook and boom topping. The 360-deg swing boom Krane Kar has a 6 ft lift. Detachment of the carrier device permits use of cable hook for normal crane work. An additional hook on the rotator is provided for supplementary crane operations, without need to remove carrier attachment. Silent Hoist & Crane Co.

For more information, circle 10-17 on card following page 100.

Carbon Brushes

Red Top Multiflex brushes are said to eliminate frayed shunts from vibration, broken brushes from vibration and shock loads, and damage caused by metal hammerplates when broken by vibration. Commutation is said to be improved and, because the spring finger is insulated from the electrical circuit, brush wear is more uniform. Speer Carbon Co.

For more information, circle 10-18 on card following page 100.



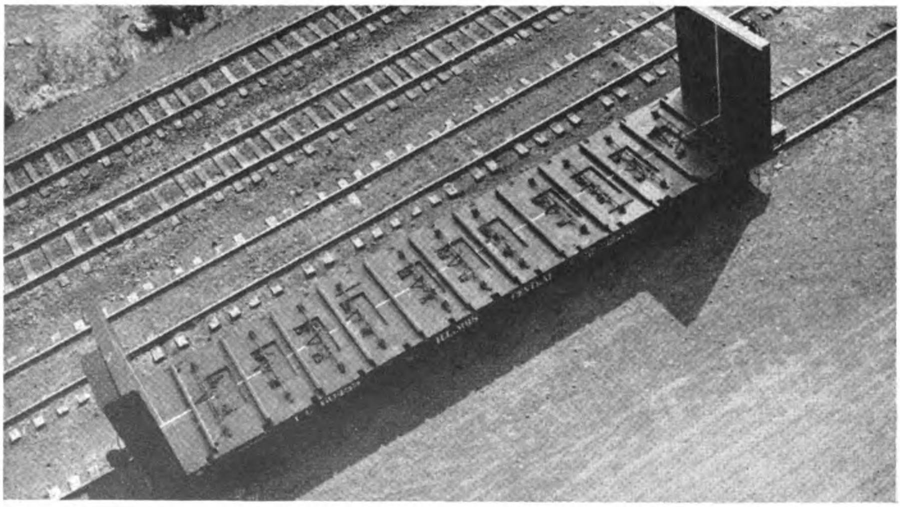
Separator Cover

A 16-gauge, perforated steel cover, held rigid by a spacer, permits visible inspection of the steam separator at all times without removing the case and insulation. Cap at top of separator tube can be inspected without removing the cap cover. The shield, it is said, is never too hot to touch. Vapor Corp.

For more information, circle 10-19 on card following page 100.

Cast-Steel Wheel

Cast-steel wheels of 38 in. diameter for 100-ton capacity cars are now available in a two-wear design. Griffin two-wear wheels have 2-in.-thick rims which can be machined to limits prescribed by the AAR. The 38-in. wheel, like its 33-in. and 36-in. predecessors, is produced by a controlled-pressure pouring process of casting in



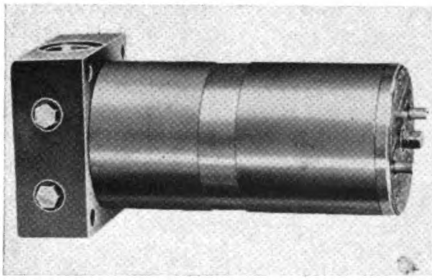
Bulkhead Flat Car

Bulkhead flat car is designed for carrying gypsum board, lumber and palletized lading. It has wood floors, wood-faced bulkheads, and load tie-down devices. The underframe is a combination of cast-steel components and rolled-steel sections. Bethlehem Steel Co.

For more information, circle 10-20 on card following page 100.

graphite molds with 89 to 97% falling within two half tape sizes, reducing wheel inventories. Tread machining is not required. Griffin Wheel Co.

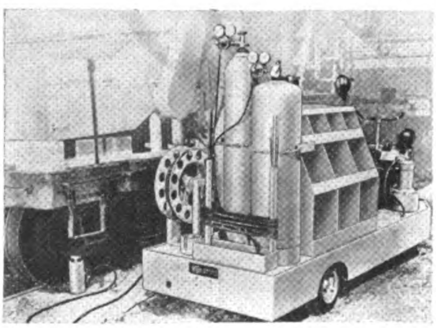
For more information, circle 10-21 on card following page 100.



Micronic Line Filter

The TF-50 micronic line filter is designed for pressures up to 5,000 psi. It is made of ductile cast iron and heavy seamless steel tubing, and is production tested at 10,000 with a minimum yield at 12,500 psi. The filter is furnished with or without integral "dirt alarm" that visually indicates when filter element needs service. It is serviced through its leakproof O-ring-plug enclosure. Oil by-passes a clogged element through a built-in relief valve. Schroeder Brothers Corp.

For more information, circle 10-22 on card following page 100.



Car Repair Truck

The Model 2500AL speed truck, designed to transport and carry tools and material for making car repairs in yards, is equipped with a 50-ton hydraulic jack, stock bins, welding tanks, and space for tools. The jack, operated from the hydraulic system on truck, may be moved to work location by use of hose reel and 50-ft length of hose. Kalamazoo Mfg. Co.

For more information, circle 10-23 on card following page 100.

Underframe Ends

Cast-steel, one-piece underframe end castings can now be had to accommodate installations of the various types of hydraulic cushioning systems which are being applied to freight cars. One design is available for cars with hydraulically cushioned sliding sills. In another design, end-of-car hydraulic cushioning arrangements can be installed. The draft sill, body bolster, and center

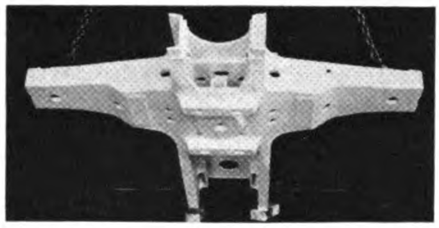


plate are incorporated in both types. Typical is the underframe end casting (illustrated) which the Union Pacific applied to 90-ton box cars equipped with Keystone Shock Control sliding-sill installations. General Steel Industries.

For more information, circle 10-24 on card following page 100.

Journal Box Cover Seal

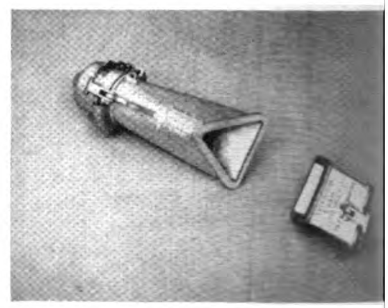
The rubber journal-box cover seal is installed between the journal-box opening and the journal-box lid. The slotted portion fits over the journal-box hinge housing. The opening is said to be covered at all times, even when the steel lid is raised. When lid is left open to indicate journal needs oil, particles are prevented from entering the journal box. Fewer cut bearings and hot boxes are said to result. With automatic oiling, the end of the rubber flap may be tucked under base of hinge. Railroad Rubber Products, Inc.

For more information, circle 10-25 on card following page 100.

Steel Coil Skid

With the free-moving, V-type coil support system in the Shunk-Yocar steel coil skid, the skid and the lading shift together within a gondola car during humping. Spring buffers at the center of the skid act as shock absorbers, allowing the skid, frame, and lading to move the 13 in. between sp stops without severe shock to the ca With the skid, a Shunk-Yocar car cover be placed on the gondola, permitting loading of larger coils and higher car h without extending car sides. Shunk M facturing Co.

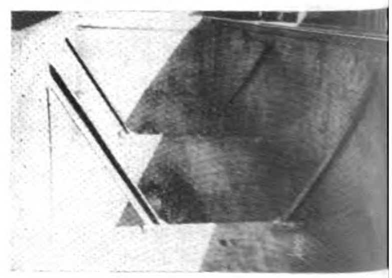
For more information, circle 10-2 card following page 100.



Discharge Valves

Pneumatic unloading of covered ho cars is facilitated by new discharge va The cast valve (illustrated), of stee aluminum, is applied to the hopper c The other valve, available in steel or st less steel, is $6\frac{1}{16}$ in. ID and 6¼ in Enterprise Railway Equipment Co.

For more information, circle 10-2 card following page 100.



Diagonal Brace

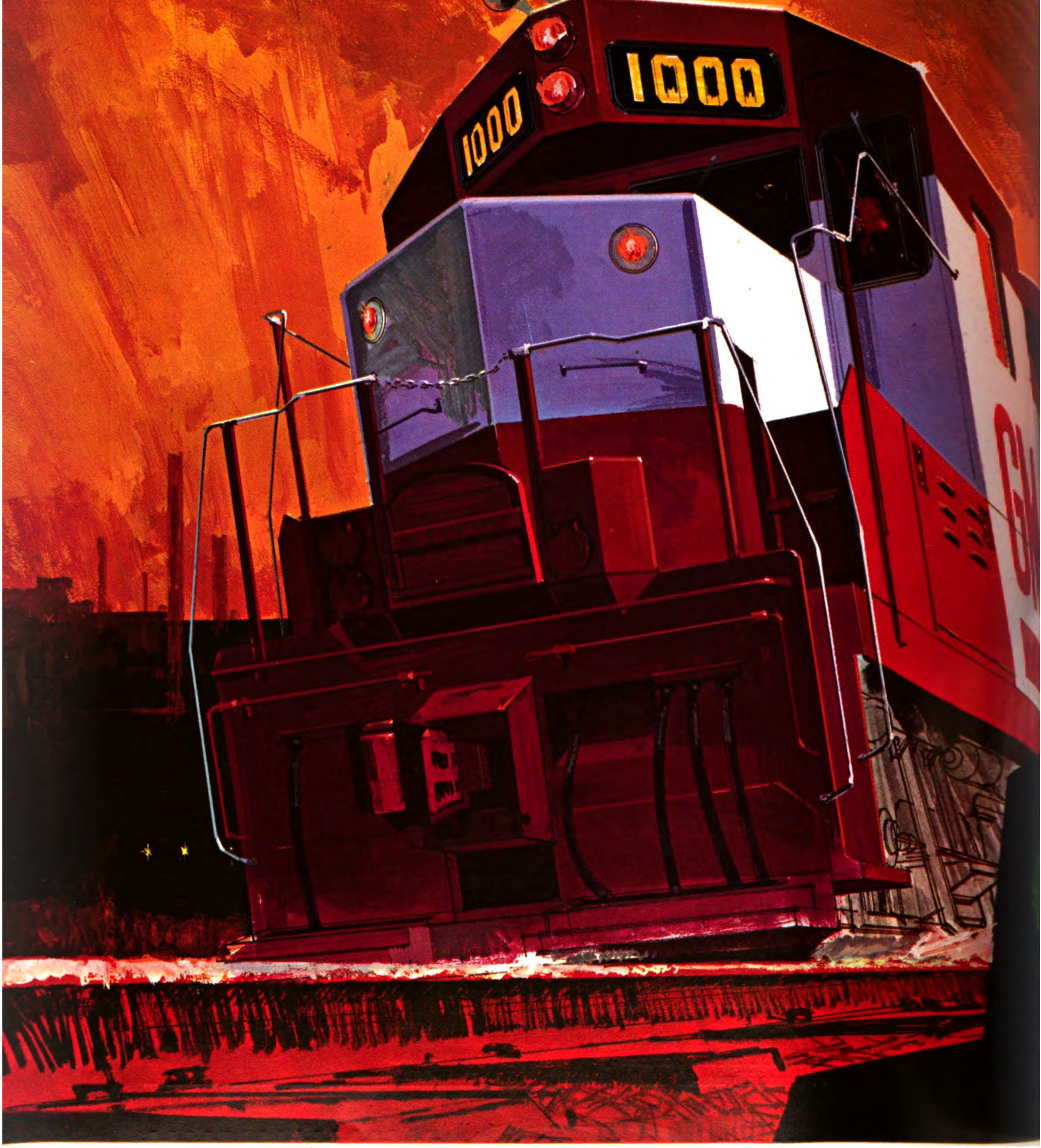
Cast-steel diagonal braces are design produce greater strength, longer li improved corrosion resistance in the ors of open-top hopper cars. The bra easily installed and are said to preclude sequent maintenance. They may be ap to new cars, or used in the heavy rep existing equipment. Scullin Steel Co

For more information, circle 10- card following page 100.

Insulation System

Improved voltage, thermal and m resistant characteristics are said to fe new electrical insulation system for ing rotating machines. The insulatio sists of a wrapper tape made up o 0.001-in. glass-dacron binder on e of a layer of integrated mica pape tape is permeated with a suspended less epoxy resin. During the curing the excess resin fills all voids and se coil without the need for applicatio

(Continued on page 33)



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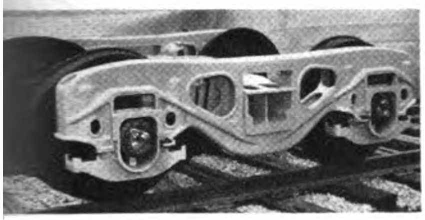
DD 35
ELECTRO-MOTIVE
GP 35
GM

(Continued from page 28)
ium and/or pressure. Thermal endur- tests representing exposure to 180 deg now the insulation's characteristics re- n practically constant at 620 volts per for 110 days, while the endurance of ventional mica splittings starts at only volts per mil and falls to 400 at the of 60 days. After a three-year test od, the system is being made standard a-c synchronous and induction machines o and including 4,800 volts, and all d-c pment. Westinghouse Electric Corp.

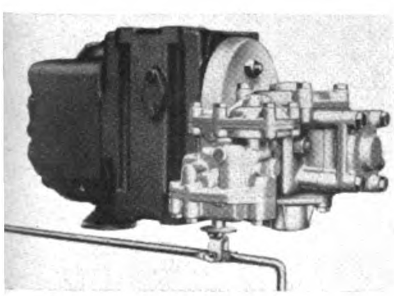
or more information, circle 10-29 on l following page 100.



eight-Car Truck

e 70-ton XL-70 high-speed freight-car ck of high-tensile steel has been devel- ed to accommodate increased carload- s and higher speeds. The original 50-ton sign was introduced in 1947. Basic fea- es of both trucks include: separate irnal boxes; load-carrying springs and ction snubbers at each side of the journal x; constant frictional characteristics, both rtically and laterally; independent side- ime equalization action to provide flexi- ity for track irregularities; positive truck uaring; full bearing bolster center-plate ntact provided through rocker bearing bolster ends; extended wheel life through ntrolled lateral and squareness of truck. mington Wayne Corp.

For more information, circle 10-30 on ird following page 100.



rake Control Valve

'he ABD-1 freight brake control valve inctions similarly to the AB valve but with diaphragm-operated type service portion iounted on a standard AB pipe bracket long with the standard emergency portion. t is said to function as the standard emer- ency portion, but at a higher level of flexi- ility and reliability. The valves are said o have been in use over six years on dif- erent properties. Components of the new ervice portion are diaphragm operated with ort alignment by means of O-rings, except- ng the slide valve. Diaphragms operate on ixed differentials as contrasted to the vari- ables of friction and ring leakage associated with metallic pistons. Diaphragms and O-rings can be replaced without technical skill. Diaphragms and check valves are made of White Mark rubber. Temperature range remains the same, —50 to 200 deg. F. Westinghouse Air Brake Co.

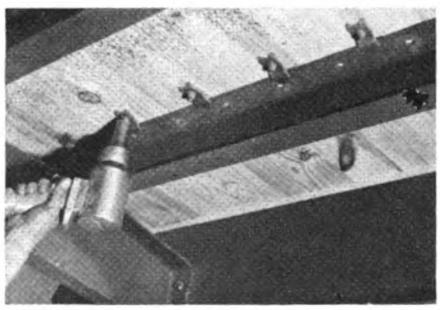
For more information, circle 10-31 on card following page 100.

Flooring Materials

Roc-Wood, a seamless, vermin-proof and fire-resistant flooring, is said to be splinter-free; impervious to most acids; and not affected by grease, oil or animal fats. It is available in two formulas: "Nailable" for box car use, and "Regular" for stock cars, cabooses, head-end cars and industrial and warehouse floors.

Roc-Wood Diamond-Hard is a compound for resurfacing and repatching wood floors. It can be applied over the existing floor with trowel and darby. Western Railroad Supply Co.

For more information, circle 10-32 on card following page 100.



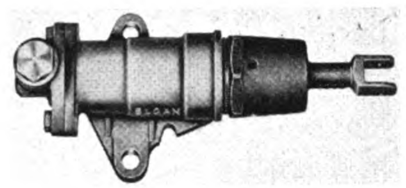
Floor Fasteners

The two-piece Huck floor bolt and clip, for use both in old and new cars, is made of carbon steel in standard ⅜ in. diameter for flooring thicknesses between 2¼ to 3 in. The fastener is installed with a straight-pull hydraulic or pneumatic tool. The floor clip has standard offsets—¼, ⅝, ⅞ and 1 in.—for attaching floorboards to framing members. According to the manufacturer, the Wabash, using the Hydraulic 504 with a Huck 99-651 nose assembly and the Huck 906 Powerig power source, installed 192 floor bolts in each of a run of cars at its Decatur, Ill., shops at a rate of 14 floors per day. Huck Manufacturing Co.

For more information, circle 10-33 on card following page 100.

Cylinder Release Valve

The latest in pneumatic-control principles are said to be employed in the redesigned Sloan-Caco brake cylinder release valve which has AAR conditional approval. The valve is available in five models: Model 2200-AB for special AB valve pipe brackets only; and Models 2300-AB, 2400-AB, 2500-AM and 2600-AB for standard AB valve pipe brackets. Models 2500-AB and 2600-AB can be operated along with the



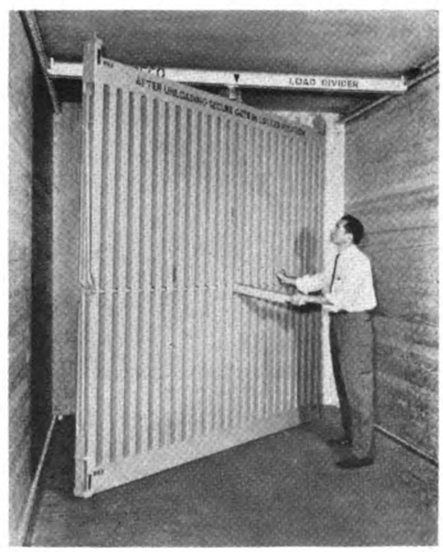
duplex valve using a one-piece straight-through release rod, in accordance with AAR specifications. Sloan Valve Co.

For more information, circle 10-34 on card following page 100.

Journal-Bearing Wedge

The elastomeric resilient journal-bearing wedge will, it is said, eliminate wear on wedge and on journal box, reduce sensitivity of wedge to damage, eliminate need for lubrication, and reduce peak shock loads on bearing, axle and side frame. The wedge will perform the normal functions of the standard wedge, which it will replace, without modification of journal box or bearing. Lord Manufacturing Co.

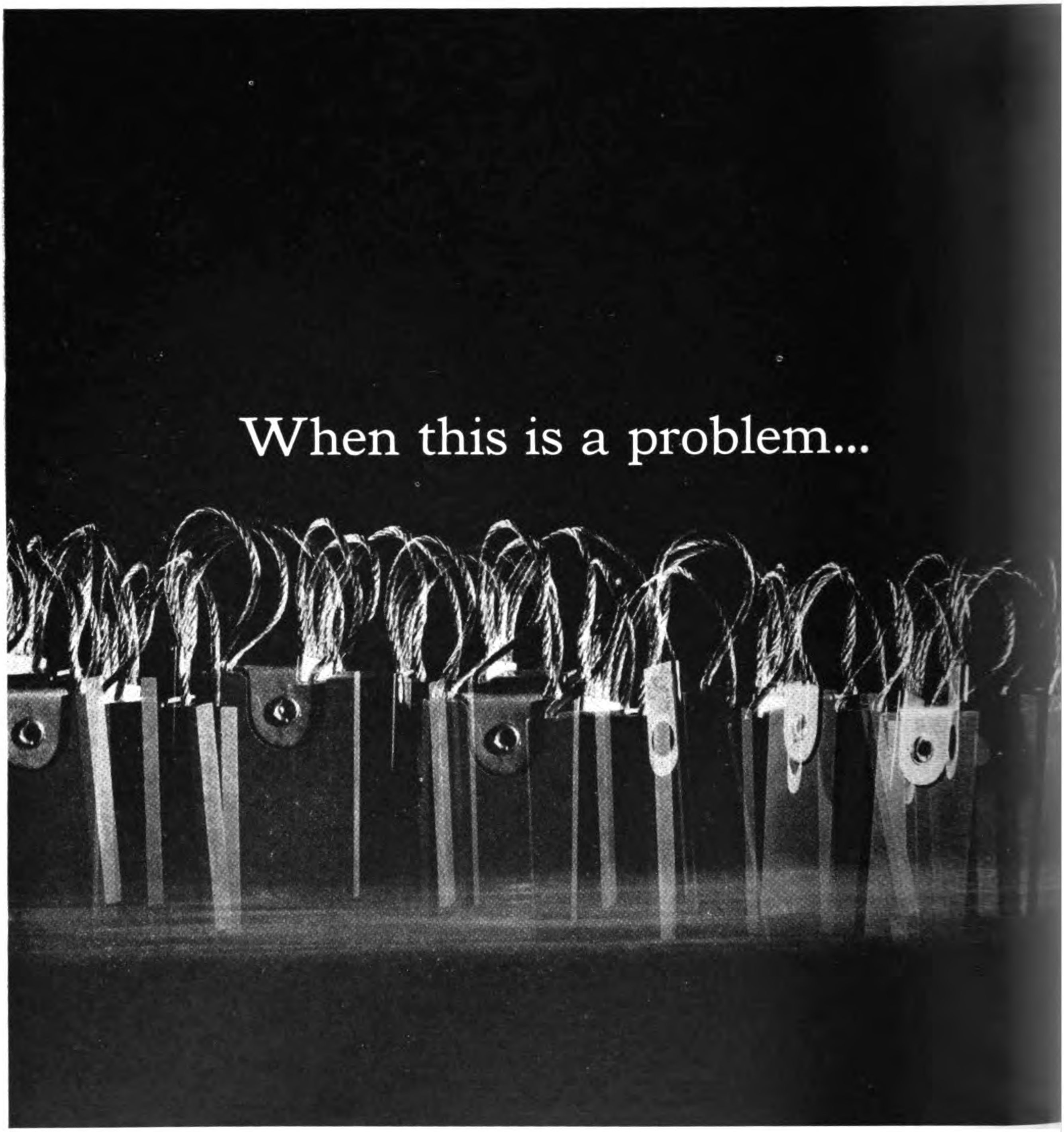
For more information, circle 10-35 on card following page 100.



Load Divider

The new one-piece, lightweight Load Divider features a gate structure of high-strength steel which is said to provide the ultimate strength-weight ratio. A typical installation in a 50-ft insulated box car weighs 3,700 lb. The design incorporates such features of the Preco top suspended two-piece gate as a special self-compensating carriage and lock system to allow for variations in car construction and reduce installation and maintenance problems. A

(Continued on page 92)



this is the answer

It's that little neoprene pad (red) that takes the shakes. Sort of a buffer that reduces vibration, eliminates uneven wear and lengthens brush life. You get improved commutation, more uniform wear, lower operating costs; no broken hammer plates, no shunt fraying, less flashovers, less commutator threading. You get Speer Red Top Multiflex Brushes, one branch of a large and efficient family of high quality brushes for electrical rotating machinery. To get to know the family better, write for complete details.

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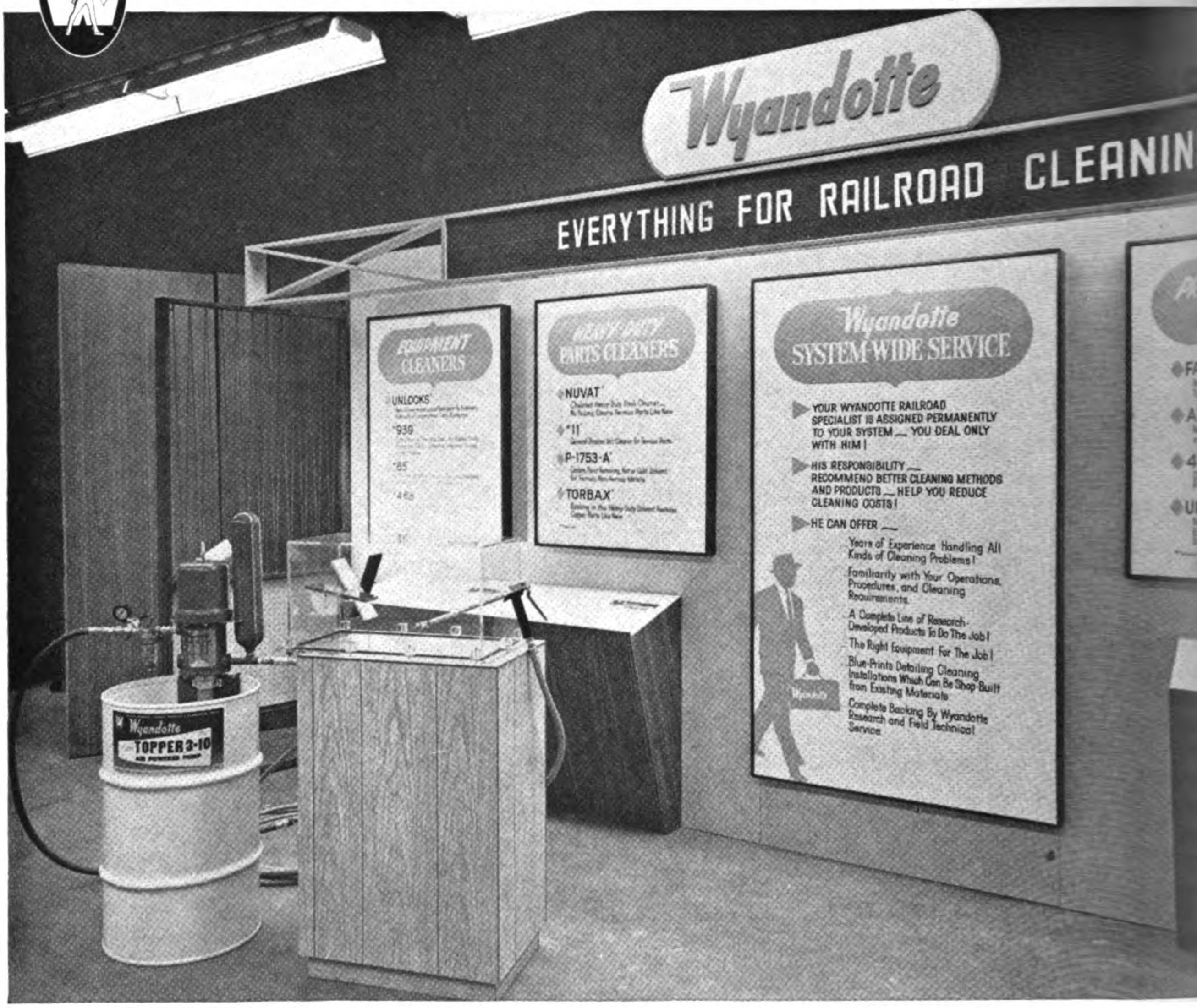

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It's the Wyandotte Chemicals Booth. Stop by and get up to date on the latest railroad cleaner and processes. We're ready to put our complete program to work for you, solving your ow unique cleaning problems. While you're at the booth, be sure to: **SEE** the wide—yet highl specialized—line of Wyandotte cleaning products. There's one for every railroad nee **WATCH** a demonstration of the new Topper air-operated cleaning pumps. It's the mos modern method of applying cleaning solutions. **LEARN** how a Wyandotte railroad cleanin specialist can help you with your individual problems.

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Editorials

ig Power, Big Cars

e Union Pacific 8,500-hp gas-turbine electric locomo-e shown on our front cover is a striking example of big ›tive power. A forerunner in this respect, it symbolizes : current equipment trend toward more powerful mo-e power and higher-capacity freight cars. This trend ll be evident to all viewing the track exhibit at the Amer-ın Railway Progress Exposition.

In this search for more power per locomotive, even the 500-hp gas-turbine locomotive has been upgraded. Sev-ıl of the 30 UP gas turbines have been changed to pro-ce 10,500 horsepower gas-turbine output for traction, : limit of the existing electrical equipment's capacity. ıe gas-turbine is only an example of big power and prob-ly is of little domestic interest to railroads other than : Union Pacific. The Union Pacific, however, has shown ıt it is a leader in acquiring big diesel-electric motive ›wer by being the first to order 5,000-hp and 5,500-hp :sel-electric units.

The big two-engine diesel-electrics, yet to be delivered, ark a year of fast-moving developments in motive power. ırting off with Alco's new Century line in January, the ar has seen Electro-Motive announce the 2,500-hp P-35 and the 5,000-hp DD-35, followed by the Union ıcific's order for three General Electric 5,000-hp U50 ıd three Alco 5,550-hp Century 855 units, both new de-ȝns. Then, along came the Alco six-axle 2,750-hp Cen-ry 628 locomotive, followed by General Electric's new ‹-axle 2,500-hp U25C.

Back of these developments is railroading's need for ›th new power to replace old and for new designs to im-ove freight service. The replacement programs will be et by acquisition of the more flexible 2,000-hp to 2,750-› models. The spectacular 5,000-hp locomotives will en-›le railroads with high-speed mainline traffic and plenty running room to use a few instead of many units for ains requiring 10,000 or more horsepower. All of the odels are expected to improve locomotive efficiency rough built-in features that make them more reliable and :tter performing machines.

In this power parade we will only mention new diesel-/draulics from Alco and Krauss-Maffei that are expected be in service early in 1964. And we should probably ention the possibility of an announcement on a diesel-ectric with an alternator, instead of a generator, and a ctifier to change the alternating current to direct current ›r the traction motors.

The freight car story is even more impressive than the cital of locomotive progress. New cars are big and most e designed for a specific service.

It is only necessary to review some current orders for eight cars to get a clear picture of what has happened ıd is taking place in the development of vehicles to carry ıe traffic. Take last month as an example. Orders in-uded: 27 33,500-gal and three 38,500-gal tank cars; 5 100-ton, 4,000-cu-ft covered hopper cars; 150 100-ton opper cars; 50 70-ton, 50-ft cushioned box cars; 200 89-ft cushioned piggyback flat cars; 59 60-ft, 90-ton cush-ioned box cars; and 1,000 4,427-cu ft trough-hatch cov-ered hopper cars.

These orders are typical of any month's purchase of new equipment. The exception is the order for the 1,000 trough-hatch cars; usually orders for special-purpose cars have been for smaller quantities. Yet the trough-hatch car is a representative example of the whole freight-car situa-tion. It is designed for a specific purpose—to carry bulk commodities such as potash. It has high cubic capacity for the relatively low density ladings. It has a full-length hatch for fast loading and oversize discharge gates for rapid un-loading.

Designing cars that reduce loading and unloading times has become a major objective of the railroads and the car-builders and requires a knowledge of handling facilities at the shipping and the receiving points. It cuts transporta-tion costs and results in greater utilization of equipment. It is one of the reasons why railroads have been able to offer reduced rates, such as in handling coal in so-called integral trains.

Big cars and specialized equipment must have a pur-pose. What they do was spelled out by Southern Pacific's executive vice president, C. F. Biaggini, in remarks before the Pacific Coast Shippers Advisory Board meeting on September 12. He said "Due to development of more types of specialized cars, the stimulus of incentive rates and increasing availability of these bigger cars, the aver-age freight car load on Southern Pacific is running six tons larger than in 1955. Without these larger payloads, Southern Pacific would have needed an average of 1,800 more freight cars available for loadings each working day during 1962 to handle this same business."

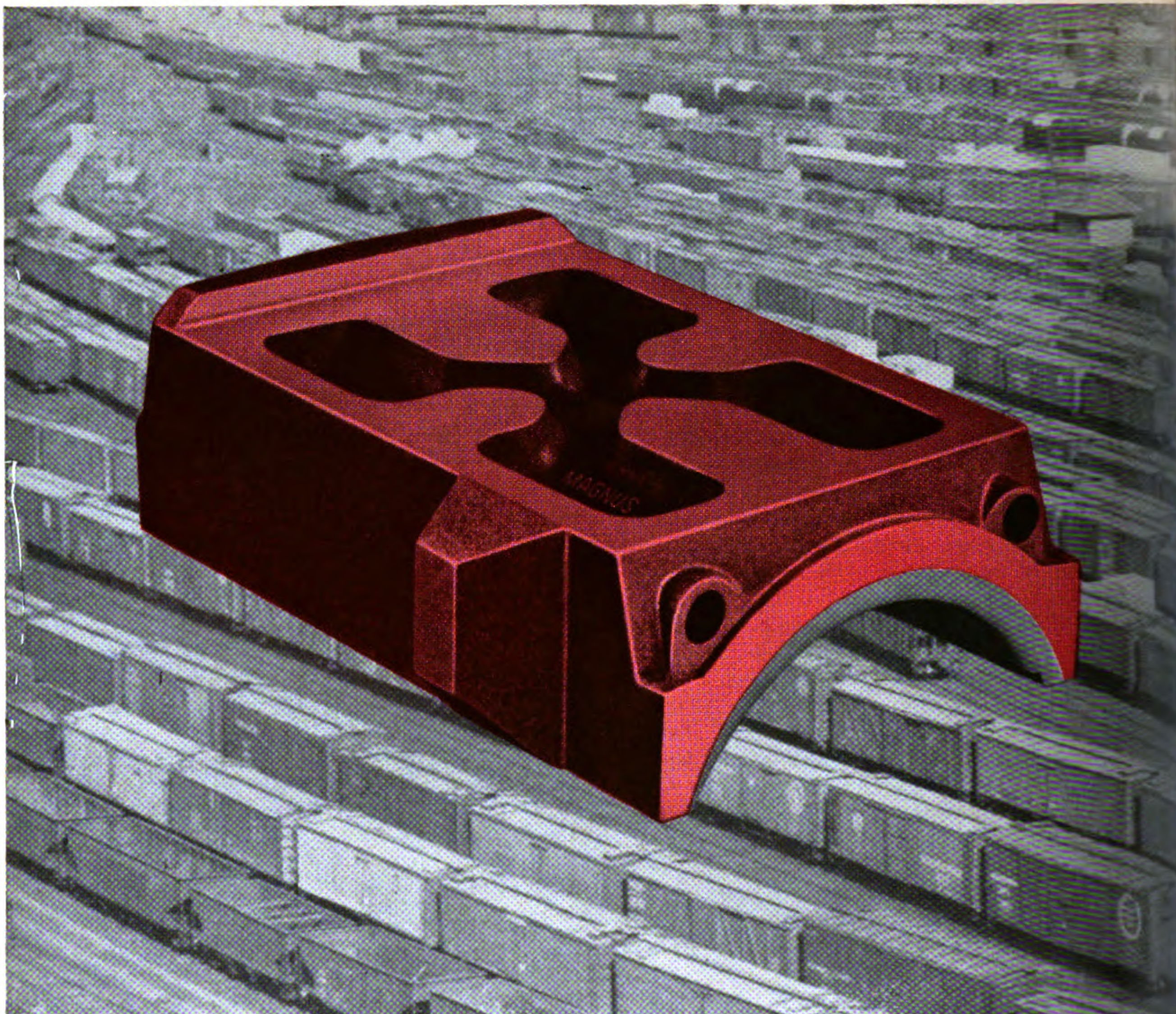
Incentive rates increased average loadings from 66,000 to 83,000 pounds, Mr. Biaggini said, and also gave the SP an additional bonus when 21,000 cars of lumber came back to the rails.

Keeping traffic on the rails and getting traffic back to the rails is the reason for the big cars and the big locomo-tives to haul them. The integral-train concept is based on meeting the competition of proposed coal-slurry pipelines and coal-by-wire operations. Piggyback operations have been aimed at recapturing traffic. Both are dependent on the availability of equipment to do the job. These are only outstanding examples.

Because of the equipment, realistic rates and expedited schedules, the railroads took nearly a million and a half trailers off the nation's highways in 1962 and are taking substantially more in 1963, according to Mr. Biaggini. With auto rack cars, he said, the railroads have been able to recover about 30 per cent of the traffic from motor car-riers, which up to a couple of years ago were handling 90 per cent of new automobile transportation.

The advancing technology in the mechanical depart-men is not just a story of big locomotives and big cars. These are the end products that utilize the developments and production of many companies, from new materials, wheels, air brakes, cushion gear, load retainers and springs to new controls, better bearings and improved fuel and lubricants.

Big locomotives and big cars are doing a job for the railroads. More than that they are symbolic of the rail-roads' determination to make full use of the inherent ad-vantage of the steel wheel on the steel rail.



You can DOUBLE present performance with MAGNUS Flat-Back Bearings

All indications point to at least 2,000,000 car miles per set-out with Flat-Backs—longer bearing life too.

Even today you get over 1,000,000 miles per hot box with solid bearings—almost 4 times the performance only 5 years ago. Overall costs for solid bearing operation have gone down, too—now average *less than half* the costs as calculated for 1955 by the AAR.

There's still more improvement—and lower costs—on the way. Magnus Flat-Backs now get better than 2,000,000 miles per hot box. That's equivalent to only one hot box for the life of four cars—*one per 120 car years.* Rear seals last longer. Journals are stabilized for better lubrication and that means maximum bearing life too.

Magnus Flat-Back bearings are cast in automated foundries, lined and machined with the most modern techniques to give you the finest solid-type bearings available today. Write for complete details. Magnus Metal Corporation, 111 Broadway, New York 6, or 80 East Jackson Boulevard, Chicago 4.

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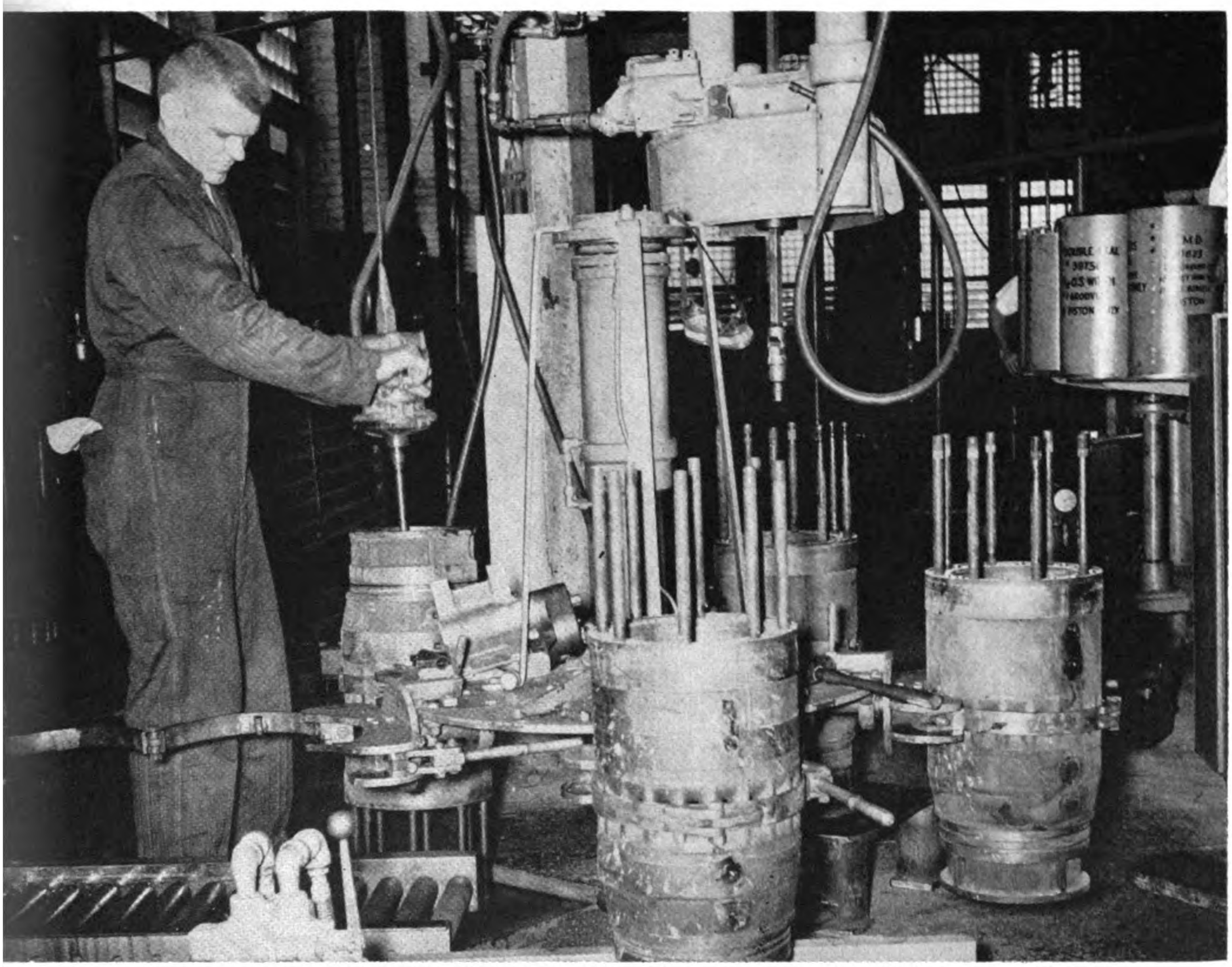


ers are completed on "lazy susan" which has five positions. Next step will be final washing and application of a rust inhibitor.

.ine Overhauls MP Power Assemblies

Road combined features of systems developed by other lines; highly refined tooling is available for reworking components

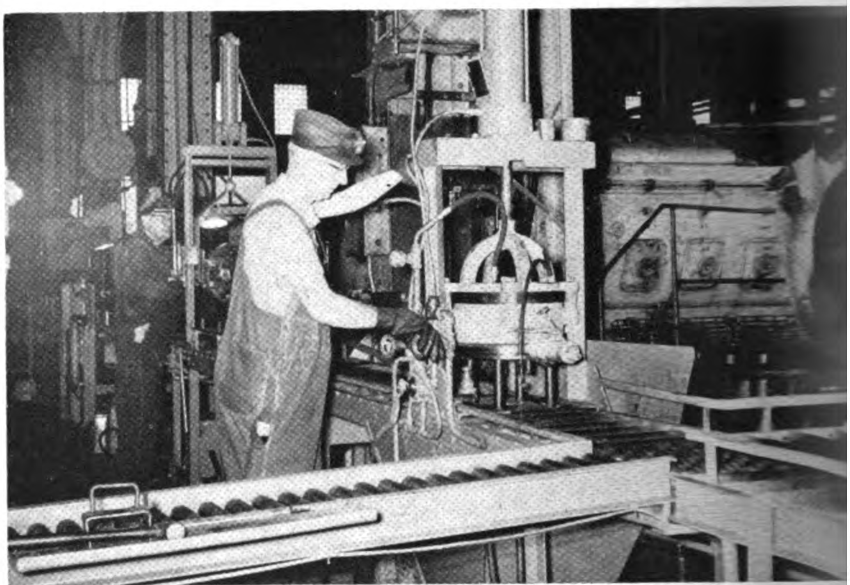
Reconditioning of power assemblies r all the General Motors diesels op- ated by the Missouri Pacific system done on a new production line in e road's North Little Rock, Ark., op. The design of the line is based ι studies made over the past two ars of material flow, equipment, and oduction capacities of similar facil- es on four other major railroads. Features of these installations, tailored to suit the shop layout, were combined with MP studies of repairs essential to keeping its fleet of 776 diesel-electric units in top operating condition.

Liners, piston assemblies and heads are changed out on EMD passenger locomotives at 30 month intervals. For EMD freight units, the interval varies from three years for GP-18's, to four years for GP-9's, and five years for GP-7's.

The production line features a continuous flow of repaired and reconditioned components to one central area where final assembly is made. All individual operations are arranged along a series of roller conveyors. These, along with monorail-mounted dollies,

special jigs, fixtures, and jib cranes, eliminate practically all manual handling. Main jib cranes are located to cover all cleaning tanks in areas where components enter the line and to serve the entire final assembly area. Most of the equipment, controls, and special handling mechanisms were designed and fabricated at North Little Rock shop.

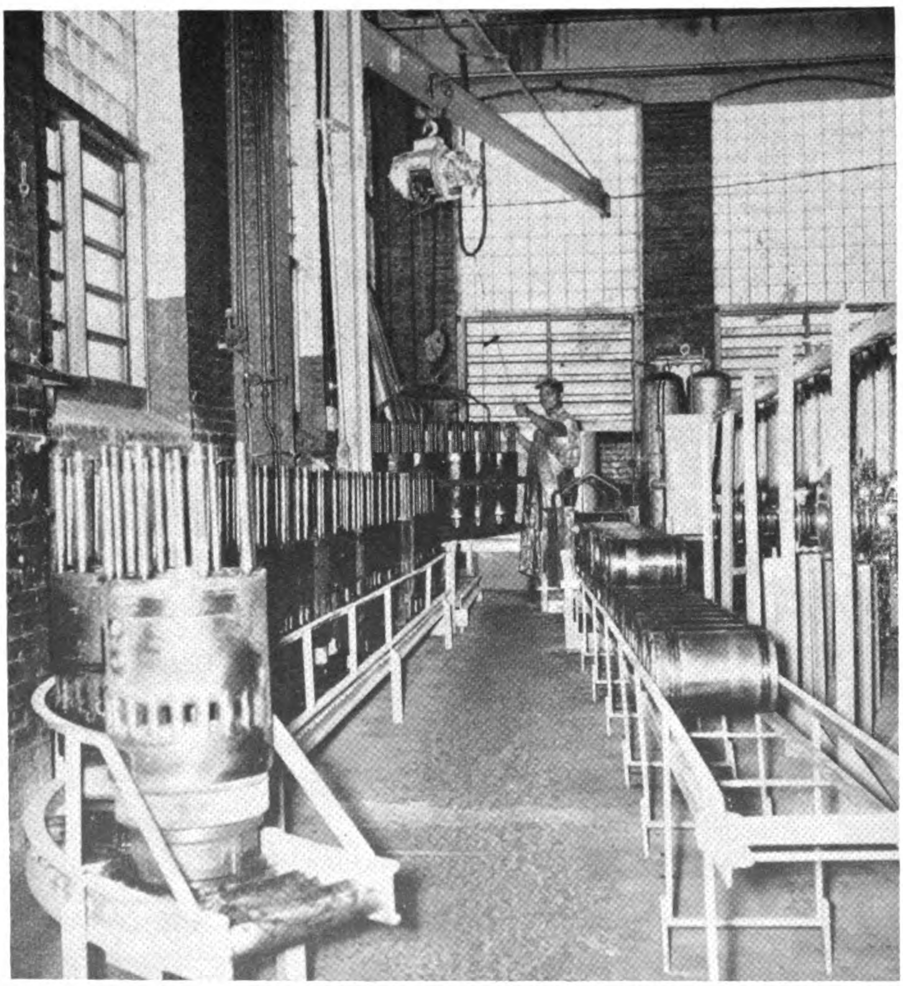
At the present time 13 mechanics, 2 apprentices, and one laborer turn out 32 complete power assemblies every working day. Two of these mechanics work a second shift, stripping and cleaning the assemblies. The component repair operations and final assembly of liners, heads, valves, pistons, piston carriers and rods is performed on the first shift, five days per week.



Water test is applied to head. Fixtures are designed to facilitate the inspection of all su
Head may be directed to any of three conveyors after water test.

In addition to filling requirements for heavy and running repairs at North Little Rock, power assemblies are supplied for main locomotive maintenance points at Houston, St. Louis, Kansas City and for outlying locomotive terminals. Incoming power assemblies may be received at Little Rock disassembled, depending on where they are removed from the diesel engines. All parts are tagged to show date and cause for removal. There are separate shipping racks for heads, for liners and for complet semblies. More than 10,000 E power assemblies are used in the fleet, all of which are maintaine this central facility.

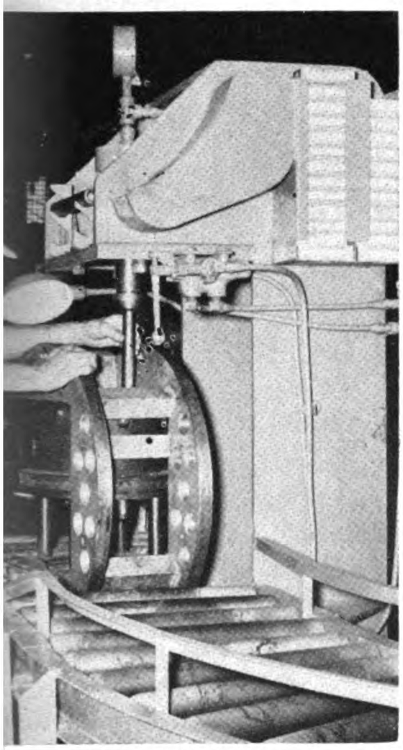
The shipping racks and parts r are moved into the shop by fork Initial inspection is made for all ken or defective components to k them from being placed on the where unnecessary repairs might made. Complete assemblies are t down. Separate roller conveyors the production line handle liners. riers and pins. Pistons roll on elev angle supports to the piston he From there, they travel upright on ler conveyors to final assembly. A the rods for B, C, or D engines dismantled, they are hung on dol which move on a double row of co veyor tracks. Empty rod dollies returned on a track beneath the c rier and pin conveyor.



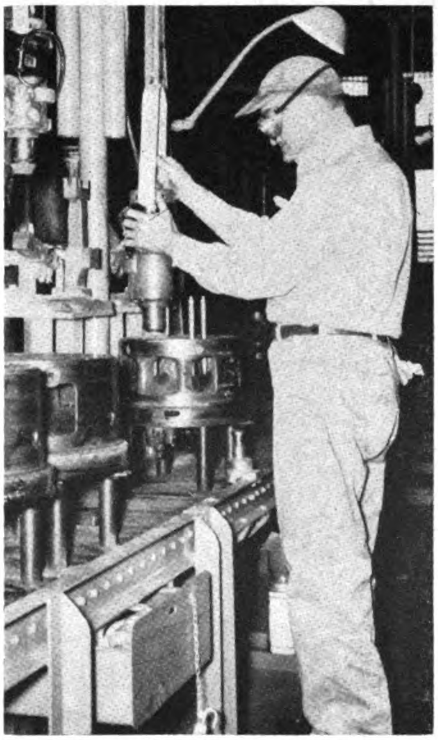
Conveyors move components through operations—liners, pistons and rods in parallel lines here. Liners and pistons are cleaned in the tanks under the crane.

Liner Inspection

Preliminary inspection of liners made for wear or scoring. Those wo beyond 0.007-in. are sent to an outsi organization for chrome plating standard size. The liners are plac on the conveyor and rolled into a po able rack which holds six liners. Th rack is designed so that the liners ca be rolled, not lifted, into position. Th rack is placed in the Aja-Dip tank an the liners cleaned with heavy d cleaner for three to four hours. I the next operation, the racked lin are placed in a rinse tank equip



;-inverter is used to remove worn guides after 180-deg turn, to apply new ones.



Counterbalanced valve-seat grinders are used on both sides of parallel head conveyors.

Springs and keepers are applied at end of head line. All four springs are compressed together.

ı spray nozzles and rollers. The rs are washed with water for four ıutes and are dried with compressed

⁻iners then roll out of the rack and ɔugh an exit door in the rinse tank ɔ another roller conveyor. Follow- another inspection which removes itional defective liners, those re- ıning next go to a "lazy susan" ch holds five. This device has five itions for final liner processing. ɛ first is a pick-up position. The ʐy susan" is then turned successive- :o ridge ream, hone, and final in- ction positions. Finally the liner is down at the last position on the er conveyor for movement to a ;h tank. The liners are positioned he "lazy susan" by hydraulic lifts. ɛy can also be revolved to place m in any position for complete in- ction of the base, "pee-pipe" hole, erior and interior. Scrap liners ve by roller conveyor to a skid out- ɛ of shop. New liners also enter the : here.

From final inspection, the liners are led individually into a wash tank l sprayed with solvent and rust in- itor for three minutes. They are n sorted by types and placed on appropriate roller conveyor for vement to the end of the line. After ver seat seals are applied, the liners placed in shipping racks for application of pistons, rods and heads.

Pistons are rolled from the initial conveyor into a portable rack which holds 16 pistons. The rack is placed in the Aja-Dip tank for four to six hours cleaning. After this, the racked pistons are placed in a roller-equipped rinse tank, where the rack is automatically located under spray nozzles. After washing with a mixture of cold water and air, the pistons are rolled through the exit door of this tank onto a second conveyor. At the next position, the pistons enter the Vapor Blast Liquid Hone and are blasted with a solution of water, air and glass beads to remove carbon from exteriors and interiors. Each piston then moves to a rotary tank where it is washed and dipped in a rust inhibitor.

After draining, the pistons roll on the conveyor to the piston bench where they are Magnafluxed and their diameters checked. Those requiring ring-groove attention roll on a separate parallel conveyor to a lathe, and are returned on the main piston conveyor to the piston bench. Here the piston is placed in a recess in the bench and turned on rollers while anti-rust Dri-Glide is applied. It is then ringed and put on a roller conveyor for movement to the final assembly position.

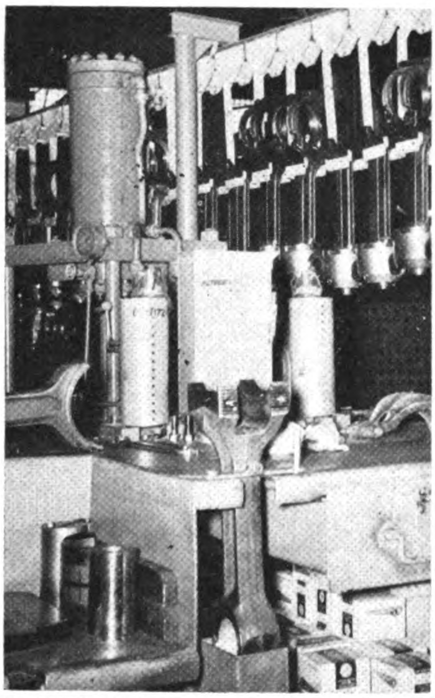
The piston bench is equipped with two rotary bins containing rings and a third rotary bin filled with thrust washers. Vapor honing, washing and dipping in rust inhibitor are done concurrently by a laborer. He also operates the piston and liner cleaning vat. This tank has specially designed fixtures for holding the portable liner and piston racks.

Cylinder Heads

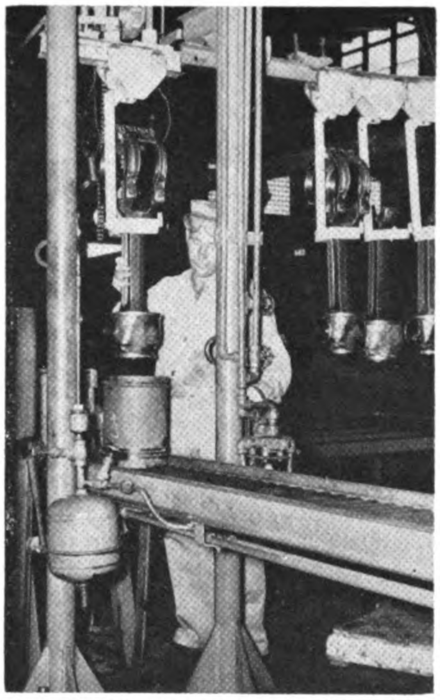
Cylinder heads, which have previously been cleaned in a lye vat, are loaded on a roller conveyor feeding into the assembly line at some distance from where liners, pistons and rods enter. At the first three head repair positions, the valves are removed; a horizontal brush mounted in the base of the roller conveyor cleans bottoms of the heads; and a vertical brush cleans the sides. The heads are then placed in an inverter where they can be turned to any position for checking valve guides, seats, injector holes and for making a general inspection for wear. The heads are then marked for disposition: refacing, new guides, scrap, or movement to valve seat grinding position.

After this the head is turned upside down by the inverter and is placed on a conveyor pallet for movement to the water test. The pallet is indexed to set the head accurately in position under the test fixtures. The fixtures are designed so that easy inspection

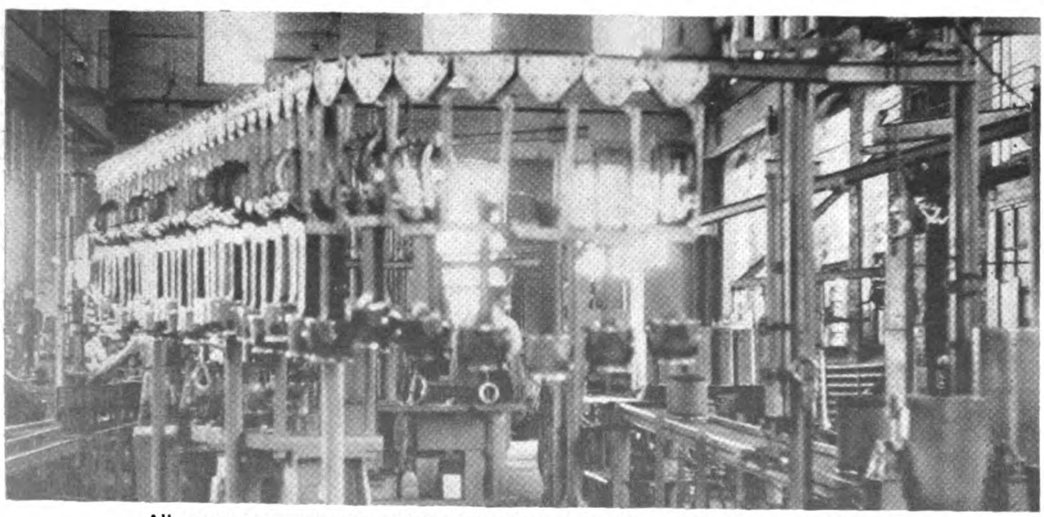
Pins and carriers are checked on bench before receiving Magnaglo inspection during overhaul.



Rod bench also has gauges for checking baskets.



Hydraulic fixture puts rod assembly in piston.



All components move to last station where they are combined as complete power assemblies.

can be made for leaks. Water p are blocked by a series of air cylinc Water at 60-psi is admitted into head's water passages until all ar removed. Then 100-psi air pres is applied. During the water tes defects are circled with chalk.

The conveyor line at this point is signed for movement of heads in th directions. Heads requiring mach ing or scrap heads move to the Cracked heads are scrapped beca the MP does no welding. Heads quiring new valve stem guides on the outer roller conveyor to a p inverter for removal and replacem of guides. Heads needing valve attention only by-pass the guide c veyor and move on to two parallel c veyors to valve seat grinders. Va seats are ground at two stations, equipped with two counterbalan grinders and two wheel dressers.

From valve seat grinding, the h moves to the next position wh valves are applied. New or regrou valves are matched to new and grou valve seats, insuring proper overall mensions.

Two "lazy susans" at this point stocked with valves. After the val are checked for height, the head placed in an inverter, turned 45 grees and the pallet removed. A ru ber band is placed over the valve st to hold the valves in position. T head is then inverted on a pallet that the valve faces are down. At next position the head is placed un a press. Springs and keepers are plied to all four valves in one operat of the press. The head is then return to the inverter, turned 180 degre and visual and vacuum tests are ma at each valve seat for leaks. After fi inspection, heads for B, C, and D gines are placed on pallets, and mov on separate roller conveyors to end of the line for final assembly.

Valves which are removed at first position on the head line fall a basket under the roller conveyor are sent to the lye vat for cleaning. return to the valve bench, they wire-brushed, receive a Zy-Glo inspe tion, are faced, and are then put "lazy susan" opposite the end of finished head line. A rotary rack h three classifications of B and D valv new, first-reground, and second-r ground. The thickness of the val head determines whether it is scrapp or not.

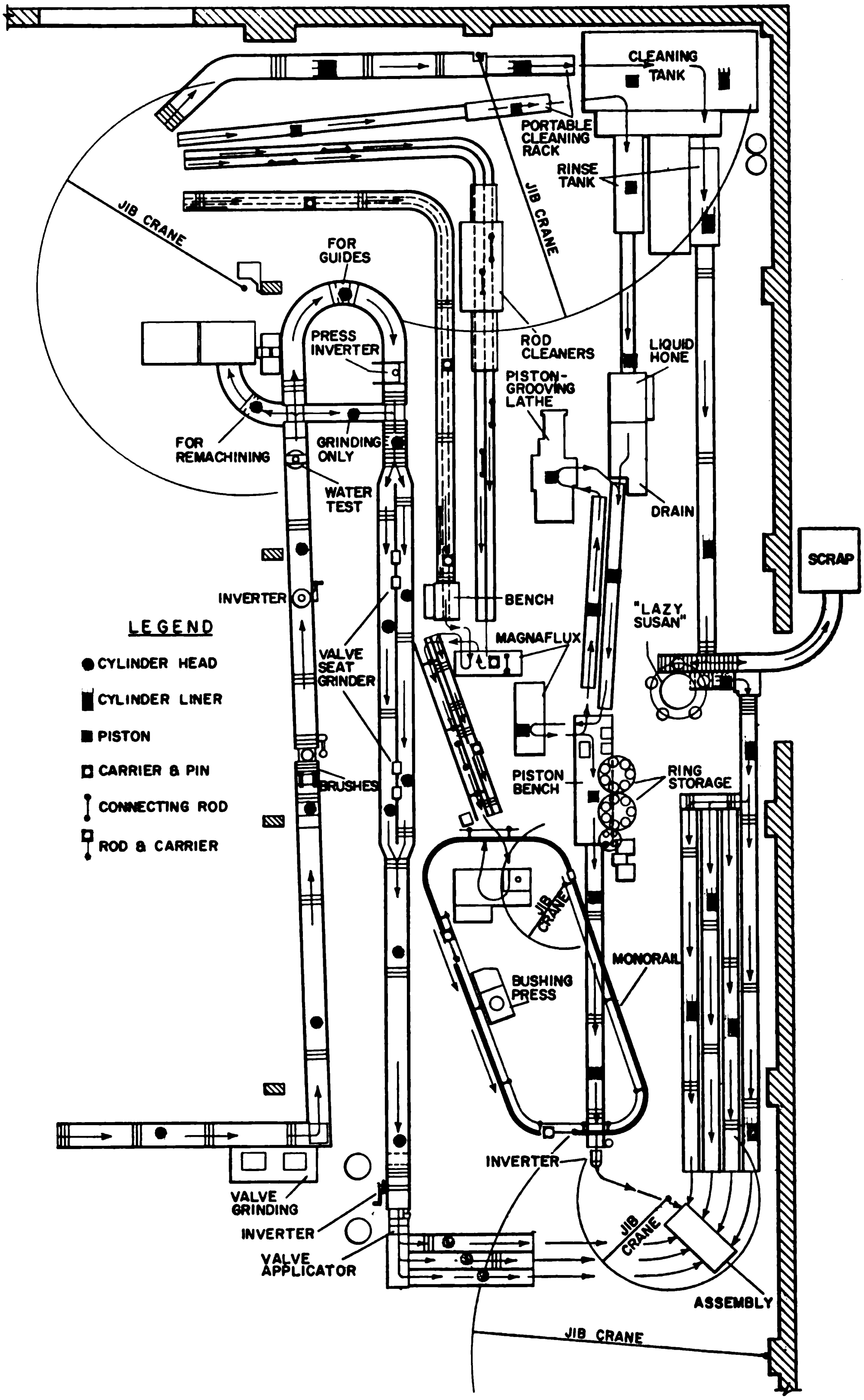
Incoming rods are placed on spec

ies running on a double row of ks and are pulled through a wash : equipped with a chain drive. hing time is 24 minutes. As the progress through the tank, they sprayed with cleaner, washed and blown with compressed air to re- e excess water. Rods are initially ected as they move out of the wash . They are then Magnafluxed, ed on dollies mounted in a double on elevated 3-in. I-beams, and ed to the rod bench. Here they removed and completely inspected ength, straightness, and condition bearing surfaces and bolt holes. ket rods are checked for basket neter. If necessary, the wrist pin ning is removed, checked and re- ied. After inspection, the rod is ed up and placed on a dolly where er and pin are applied. The assem- s then raised vertically to a gravity orail for movement to the final mbly positions.

riers and Pins

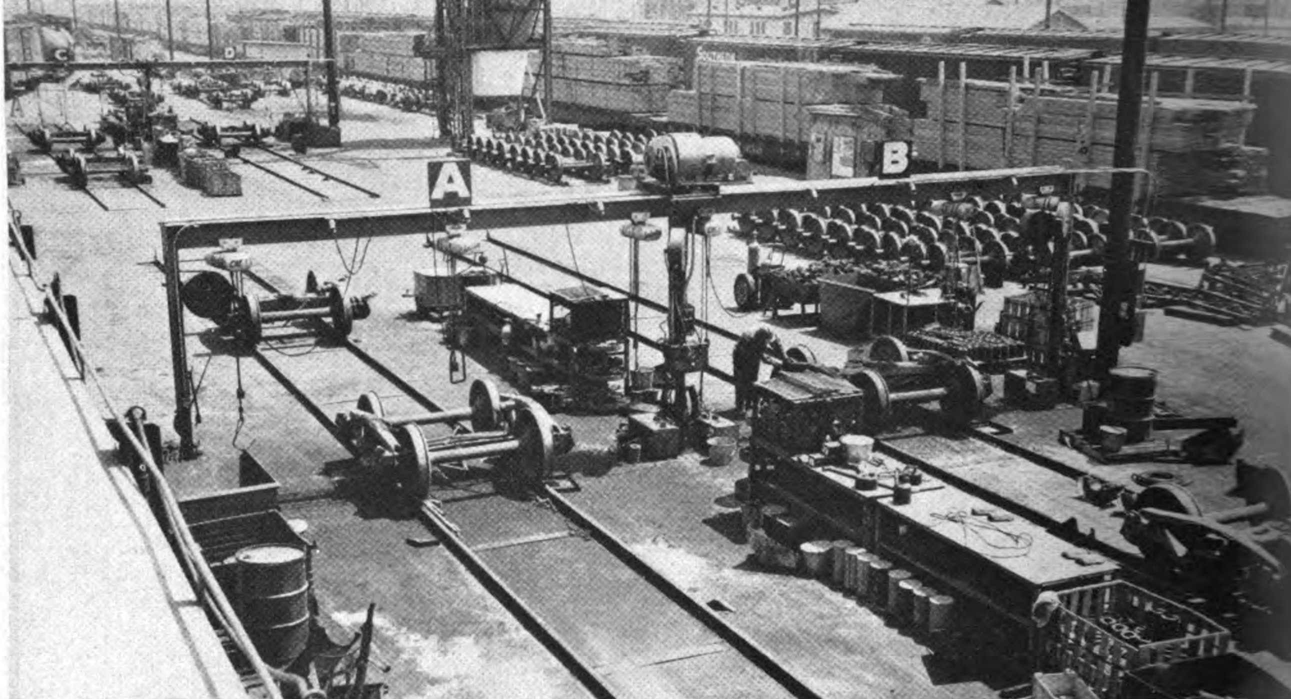
he operator who makes the Mag- ıx rod inspection also processes iers and pins. These arrive at the bench on a separate roller convey- parallel to that carrying the rod es. Complete inspection is made ne carrier, including check of its neter and height along with meas- nents of wrist pins and bushings. carriers and pins are then placed ı roller conveyor beneath the rod es and move to the rod bench.

t final assembly, all components within reach of the jib crane. The s have been placed in the shipping . A rod is applied to the piston ringing it over the piston conveyor lowering it with a hydraulic fixture the piston. The hydraulic fixture three positions. The high position rns empty rod dollies to the rod ch. The center position picks up rod to be applied, either fork or et end. The lower position ap- s the rod to the piston and retracts. nap ring is then applied to the pis- from an adjacent ring supply bin. he piston and rod is then inverted fixture which brings the piston bolt hole to the top. The assembly en applied to the liner through a red cylindrical ring compressor. r the heads are applied, the re- litioned assemblies are turned to the stores department for dis- ution.



Power Assembly Overhaul in Small Area

Power assembly overhaul facilities in the Missouri Pacific shop in North Little Rock have been established in an area of about 7,500 sq ft. Conveyors are designed to place the parts at convenient working height at each of the work stations along the five separate lines over which these EMD power components pass. All parts flow to the final station, lower right, where they are assembled for use in the local heavy or running repair shops and at all other main and running-repair terminals along the MP system. Main locomotive maintenance points, in addition to North Little Rock, are Houston, St. Louis and Kansas City. The road's fleet of General Motors locomotives involves operation of more than 10,000 power assemblies. At present 32 assemblies are produced in this shop each working day by a force of 15 men.



Four stations, each tooled for complete car-truck rebuilding, handle heavy and running-repair requirements of one of SP's major yards.

SP Centralizes Repair of Car Trucks

High-capacity fork lift, used for moving car trucks, is also used to elevate empty cars.

Cars requiring wheel or truck work are handled expeditiously at Southern Pacific's Taylor Yard in Los Angeles because of a centralized truck repair station. A high-capacity fork-lift assists in producing further economies. In the case of empty cars, the 15-ton fork-lift truck is used in place of jacks for elevating cars to permit running-gear repairs. After carbodies are raised and placed on stands, the fork-lift then handles the trucks to and from the overhaul station. Loaded cars are jacked and then the fork-lift, fitted with a special sling, moves the trucks requiring repair. SP reports its new system is helping to minimize delays to loaded cars and, by speeding all truck work, is making possible a reduction in unit car-repair costs.

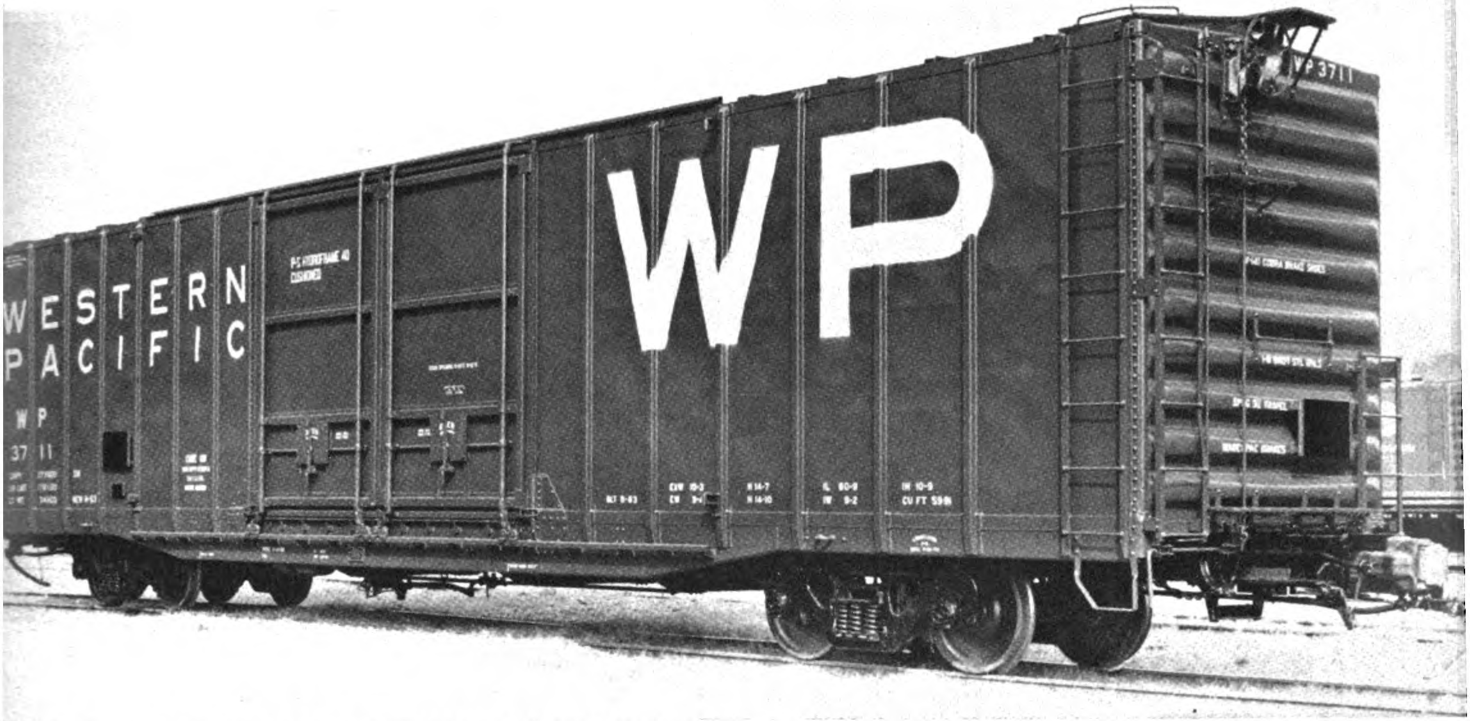
The truck-repair station includes two spots on each of two tracks equipped with overhead bridge cranes and 1-ton electric hoists positioned to facilitate dismantling and reassembly of trucks.

Oxyacetylene, natural gas and compressed-air hose reels and electric welding machine leads are conveniently positioned at each repair spot. The electric welding machines are located at the centers of the bridge cranes where they are out of the way but make it possible to reach all welding jobs with relatively short cable leads. All journal-size, journal-box, wedge, and other gauges at the four repair stations are given close attention to keep them accurate. They are all mounted so as to be within easy reach for checking truck parts.

Mounted car wheels, still being reconditioned and produced in the wheel department at Alhambra shop, are stored on tracks close to the tr repair stations. Bolsters, side fra and all other truck parts are also veniently located and can be mov easily when needed. Before being used, second-hand truck springs checked in a hydraulic testing mach to insure that they can carry spec loads.

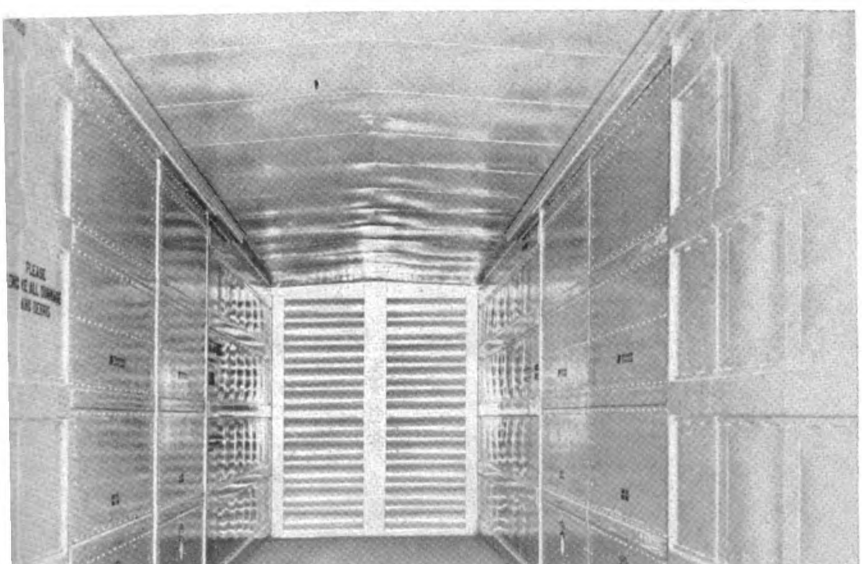
The repair force consists of carmen, two at each spot, plus other man to do electric welding any of the four repair stations. T output averages about twelve tr a day, three from each spot. trucks produced in excess of the immediate demands are stored future use on system cars. This m possible quick changing of tru allowing early return to service of cars, whether loaded or empty, wh have only wheel or truck defects. 15-ton fork-lift truck has proved be a major time-and-labor-saving vice when lifting car ends for tr removal. The lift truck with one op ator can do this in a fraction of time required by several men to m heavy jacks to the job, install blocking underneath, and slowly j up car ends so trucks can be remo

The fork-lift truck has a length of 331 in. and a width of in. Its outside turning radius is 231 The truck weighs 47,320 lb and lift 35,000 lb safely at 36-in. center. Forks can be manipul laterally as well as up and down



e-sheathed cars being built by Pullman-Standard are distinguishable by their outside side stakes, a feature of many P-S box cars.

-S and Santa Fe Building Automobile-Parts Cars



iors of P-S cars are smooth; floors are nailable steel; doors are newly designed.

Automobile parts cars are currently rolling from the production lines of four different shops—three commercial car-builders and one railroad. Pullman-Standard's plant at Bessemer, Ala., and the Topeka, Kan., shop of the Santa Fe have followed Greenville Steel Car and Thrall Car Manufacturing in producing the 60-ft cars which Ford Motor has requested from 25 railroads for moving parts traffic between its fabricating and assembly facilities. The new cars are to make it possible for Ford to release a large number of conventional cars now in this service. Unlike their predecessors, the new models are characterized by an absence of interior fixtures; all parts are handled in large racks which are removed for loading and unloading.

The Santa Fe and Pullman-Standard cars are similar in size and arrangement to those already produced by Greenville and Thrall (RL&C, September 1963, p 23). Like them, the new cars have hydraulically cushioned underframes with 20-in. travel, 16-ft doorways, and 6,000-cu ft capacity. There are only minor variations in the interior dimensions of the cars turned out by the four shops.

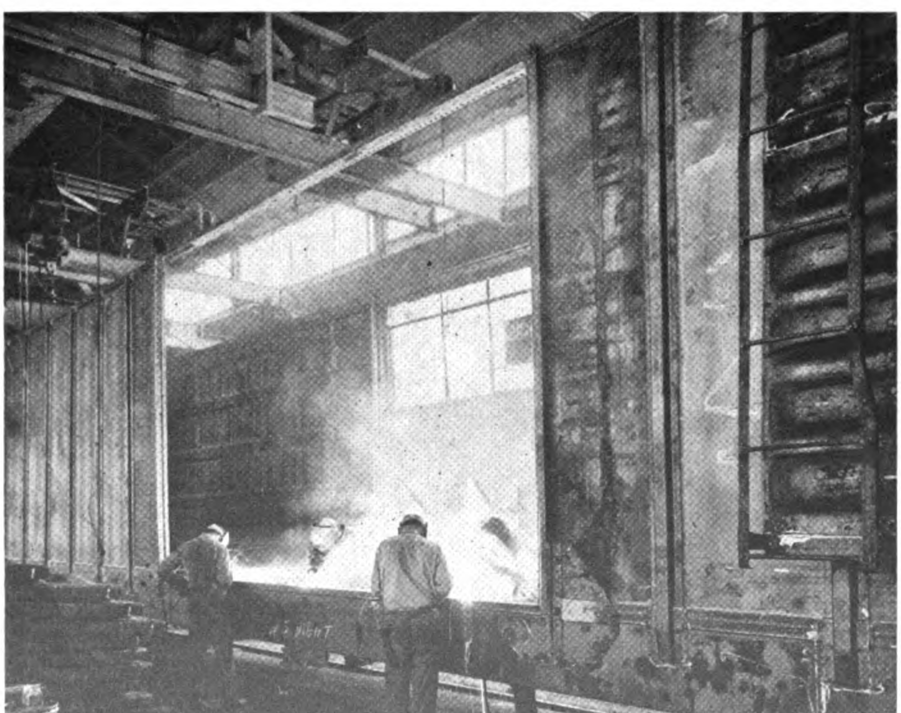
The P-S cars, of nominal 100-ton capacity, are being delivered to the following roads: Burlington, 50; Cot-

Riveted sides characterize Santa Fe parts cars. Interiors are fitted with DF belt rails. Center sills are 13-in., 31.8-lb channels. Sliding sill is composed of AAR Z-26 41.2-lb sections. The six floor stringers are 5.7-lb I-beams to which the wood flooring is secured.

ton Belt, 5; Frisco, 25; Louisville & Nashville, 60; Milwaukee, 25; Southern Pacific, 25; Union Pacific, 50; Western Pacific, 25.

Ford, railroads participating in its traffic, and builders supplying the cars have worked closely in their over-all design and in the details of the components used on them. Pullman-Standard's are typical. They are all welded and single sheathed. Length over strikers is 66 ft 3 in.; over end sills, 60 ft 11 in. Inside length is 60 ft 9⅝ in.; inside width between rub rails, 9 ft 2 in. Height over running board from rail is 15 ft 3⅛ in.; inside height, 10 ft 9 in.

All P-S cars are fitted with Hydroframe-40 cushion underframes. The sliding center sill consists of two Z-26, 41.2-lb sections with top flanges seam welded full length and fitted at the ends with built-up welded draft pockets for the conventional draft gears. Couplers are special Type E head, F butt models, modified for 43 in. length from pulling face to center line of yoke pin. Stationary sill consists of two inverted Z-26, 31.3-lb sections with top flanges jointed by a 19- x ¼-in. plate extending the length of the car. Bottom flanges are tied by the center plates at the bolsters and by 8-in. channels at the crossbearers.



Welding has major role in assembly of P-S parts cars in Bessemer. Reinforcement under doorway is 18 in. deep and extends for 24 ft through the center of the car.

Body bolsters are a built-up, weld design of Tri-Ten steel with ⅜- web plates. Bottom cover plates ¼-in. Tri-Ten. The four crossbear are built-up welded construction ¼-in. web plates. Top cover pla extending from side sill to side sill, 5¾ x 7/16 in. Bottom cover plates 8 by 5/16 in.

Outside Side Stakes

Unlike all other auto parts cars being built, the P-S cars are outside-side-stake design. The si sheets are hot rolled OH steel, 0. in. thick, except for ¼-in. plates adjacent to corner and door posts.

The 6- x 4- x ⅜-in. rolled an side plates, extending from end to e are reinforced by a 5/16-in. pressed gle approximately 24 ft long throu the doorway area. The side sill co sists of a 6- x 4- x ⅜-in. Tri-Ten an extending from end to end of car. 5/16-in. Tri-Ten pressed angle, 18 i deep, reinforces the center of the c The twelve side posts are 3/16- pressed hat sections. The five inter rub rails are 3/16-in. pressings on proximately 30-in. vertical cente The Camel double-plug doors on ea side may be operated from outside inside the car.

Car ends are a welded design, co sisting of a 5/32-in. top plate and a co rugated 0.1793-in. bottom plate. T welded roof has outside carlines 3- x 2- x ⅜-in. rolled-angle spaced 41-in. centers and welded to the 5/ sheets.

Floors in the first 105 cars are 1¾-in. nailable-steel design fabric ed from Tri-Ten. Part of the last cars will have E. L. Bruce Dura-Wo flooring; the remainder, D. B. Fra ton Doweloc.

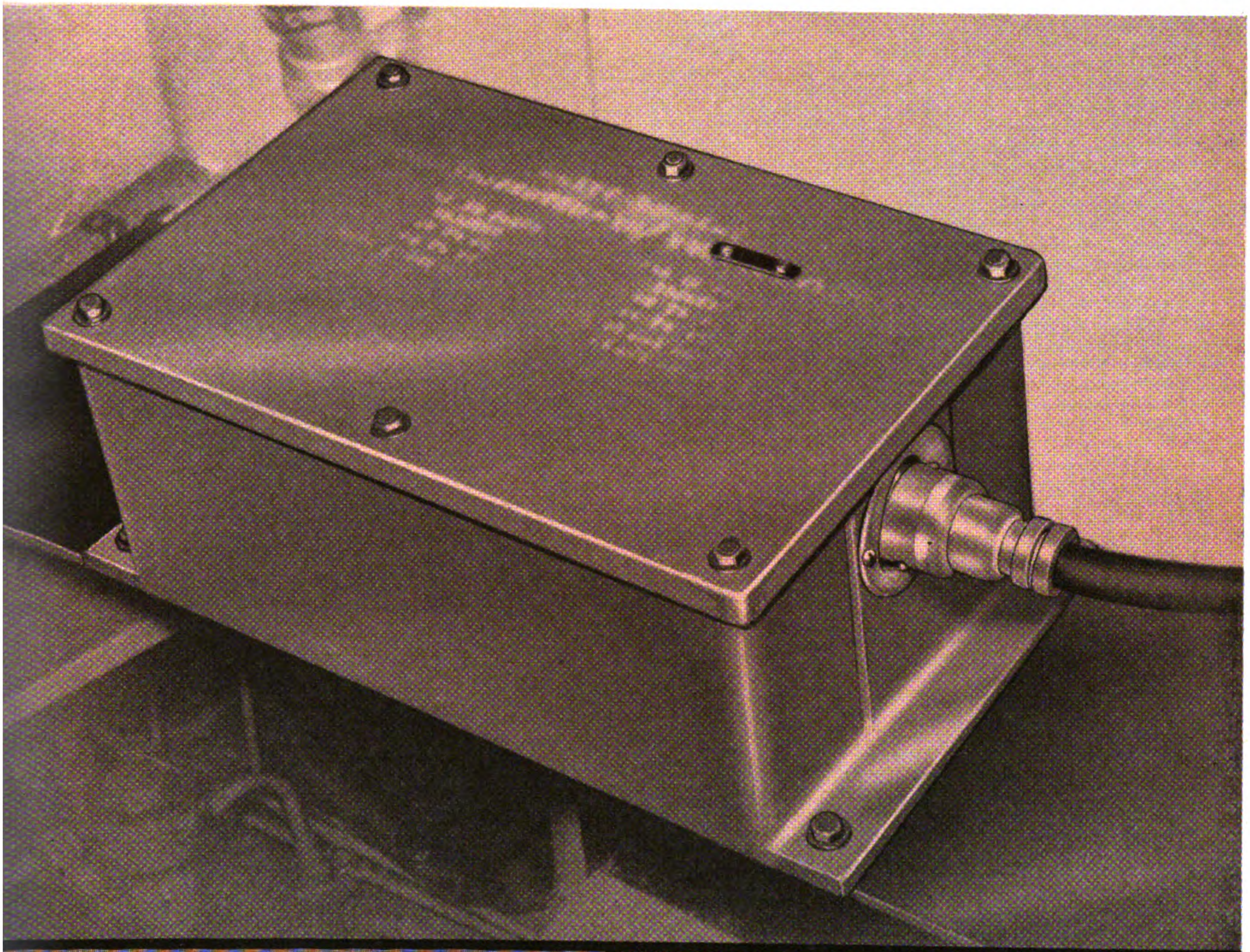
Trucks on all P-S and Sante Fe c are ASF Ride-Control design w Timken 6½ x 12-in. roller beari and 36-in. rolled and cast-steel whee The majority of the P-S cars ha Wabcopac brake installations.

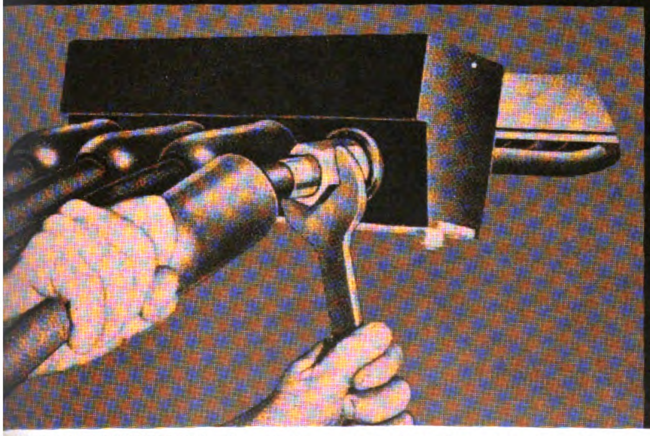
Bodies of the 100 Santa Fe cars similar to those produced by Gre ville Steel Car a single-sheath riveted arrangement with inside stakes. Hydraulic cushioning is stone Shock Control with 20-in. el. Flooring is 1¾-in. wood p completely covered with 3/16-in plates. Rub rails are DF-2 belt which would require only the ins tion of crossbars to place the cars general service.

POWER

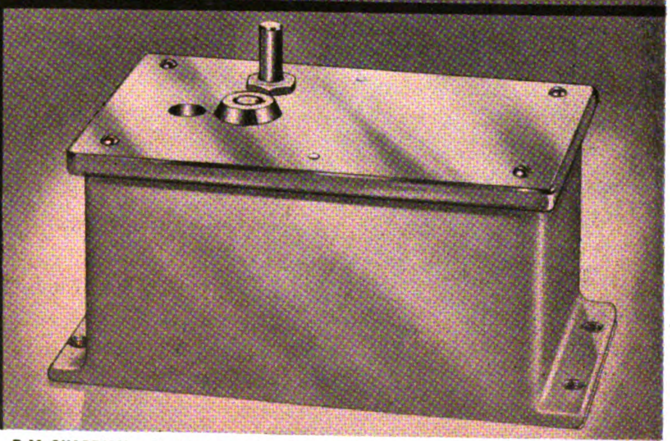
ITH PAXTON-MITCHELL

Replace motor generator sets used for controls in diesel locomotives for lower initial costs . . . lower maintenance costs. The P-M Power Converter converts a range of 64 to 80 volt DC to 13 volt, 325 watts continuous duty for radio service, or to 33 volt, 150 watts continuous duty for cab signal. The P-M Power Converter is mounted in a rugged aluminum housing measuring only 11″ x 18″ x 7″. Guaranteed for two years, it will probably give seven to ten years operation without maintenance.



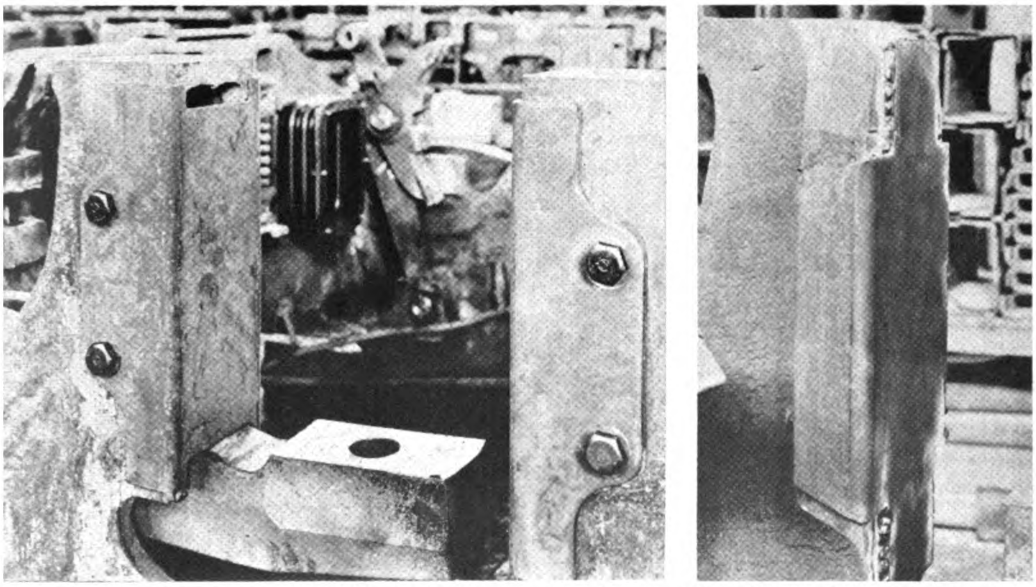


LIAMSGRIP CONNECTORS Speed change-out of traction motors on diesel ts with Williamsgrip Connectors. Williamsgrip Connectors end the use maintenance of glad-hands...eliminate taping and untaping cables. h these performance tested and proved Connectors a quarter-turn tight- cable connections. Special materials—black neoprene and special y copper—assure proper performance under all conditions.



P-M GUARDIAN Reduce repairs to traction motors. Limit the length of time your ground relay switch can be held closed as well as the number of times it can be reset. P-M Guardian automatically checks an engineer allowing him only a pre-set length of time to hold your ground relay switch closed, as well as limiting the number of times it can be reset. This item is positive and foolproof—Why don't you start saving money today?

PAXTON-MITCHELL Company
27th & Martha Sts • Omaha, Nebraska



Wear plates in car and locomotive trucks are replaced much less frequently in NYC shops since prehardened manganese-steel types, either bolted (left) or welded (right), are being used.

Prehardened Pedestal Liners Adopted by NYC

Wear plates of prehardened, high-carbon manganese steel have been adopted by the New York Central for pedestals and journal boxes to reduce truck maintenance problems and costs. The manganese-steel journal box and pedestal liners, prehardened by Manganese Steel Forge Co. with a patented heat treatment, exhibit about twice the wear resistance of standard manganese-steel liners.

Severe impacts, loads, and abrasive conditions are imposed on the wear plates which are welded to journal boxes and bolted, or welded, to locomotive and car truck frames. Liners are not lubricated because lubricants would cause them to wear more rapidly when sand, rust flakes, and other abrasive particles adhered to the lubricant. The relatively high coefficients of friction of most materials, when run without lubrication, tend to accelerate wear, induce galling, and cause excessive heat. At track joints, liners are subjected to heavy impacts with forces being functions of train speed and the size of the irregularity. High strength is essential to prevent fracturing.

NYC evaluated liners of conventional and new materials, including mild steel, hardened carbon steel, stainless steel, T-1 steel, aluminum-bronze, rubber bonded to steel, standard Hadfield type high-carbon manganese steel, and the prehardened Hadfield manganese steel.

Mild steel was extruded and fell out of the journal in flakes under the heavy impacts. High-strength, low-alloy T-1 steel presented fabrication problems and tended to gall in service. Aluminum bronze galled and cold flowed. Stainless steels cold flowed. Rubber bonded to steel deteriorated under impact, abrasion and exposure. Hardened carbon steel, tested extensively for over a year, outperformed the other materials but provided less than half the wear resistance of standard Hadfield type manganese steel.

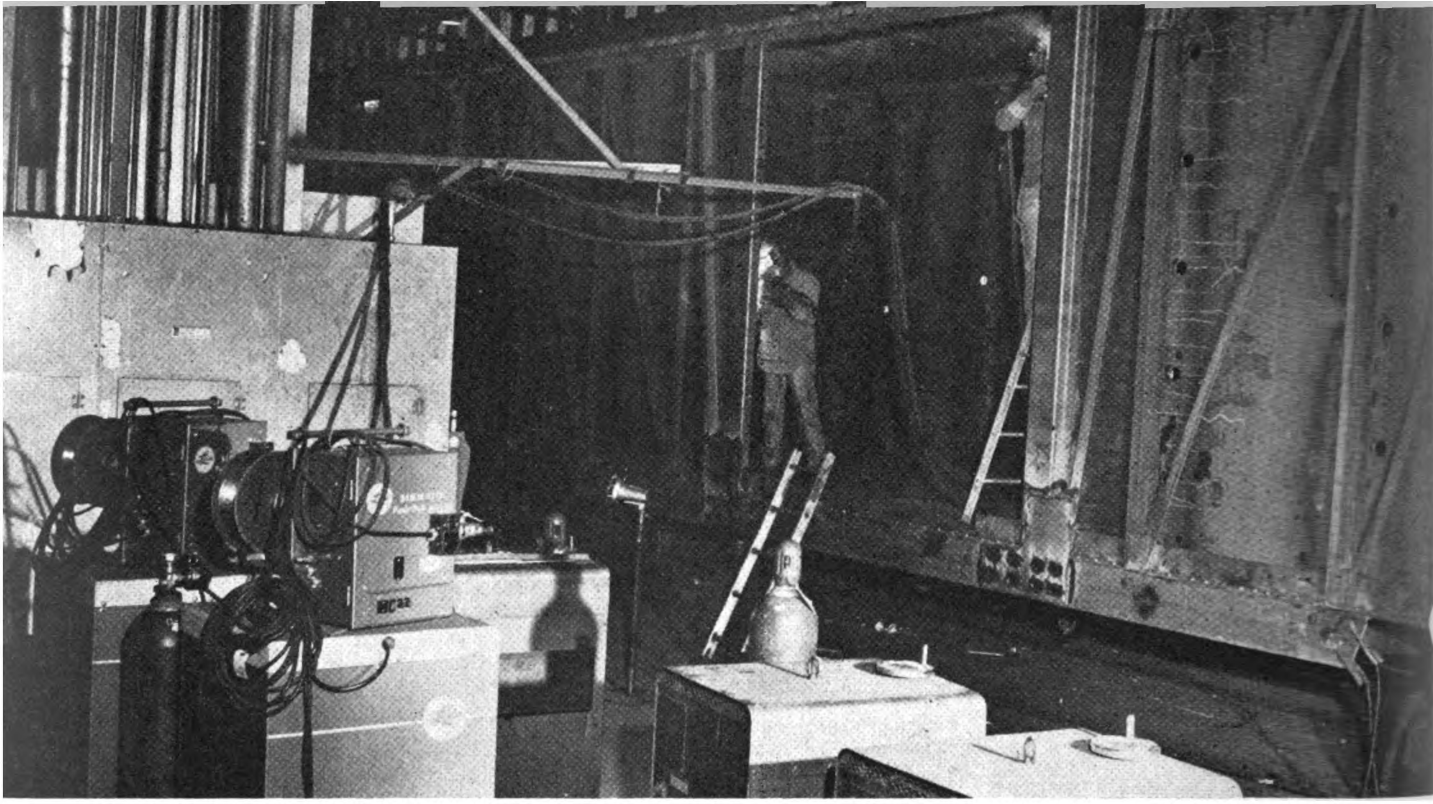
Next, the NYC conducted a two-year test comparing prehardened with standard Hadfield type steel. The latter is widely used for journal box and pedestal liners along with other heavy-duty applications such as brake rigging pins, center-plate liners, motor-nose chafing plates, and equalizer wear plates. Impacts in service cause Hadfield steel to harden to as much as twice its original hardness. Hardness occurs in a surface zone, leaving a strong, ductile core beneath. Ultimate hardness ranges up to 65 Rockwell C from an original 90 to 95 Rockwell B.

Work-hardening manganese steel journal box and pedestal wear plates gave 2½ to 3 times the wear life of carbon-steel plates on NYC locomotives and cars. This, however, ... only about half the wear resistanc... the prehardened plates which ha... initial hardness of 35 to 38 Rock... C. Hardness and initial yield stre... are about twice as high as the ... hardened liners. The patented ... treatment, in contrast to preharden... techniques such as peening, cold ... ing and explosive hardening, produ... a uniform hardness throughout.

In one typical test, prehard... manganese-steel liners were insta... in one truck of a diesel locomotive ... standard manganese-steel plates ... installed in the other truck. Meas... ment after 259,000 miles of ser... showed no appreciable wear on ... prehardened metal which still m... ured ¼ in. thick. The standard ... carbon manganese-steel liner sho... $\frac{1}{32}$ in. wear. In another test, preh... ened liners showed only $\frac{1}{64}$ in. ... after 323,000 miles service as c... trasted with $\frac{1}{32}$ in. wear on stand... impact-hardening steel liners.

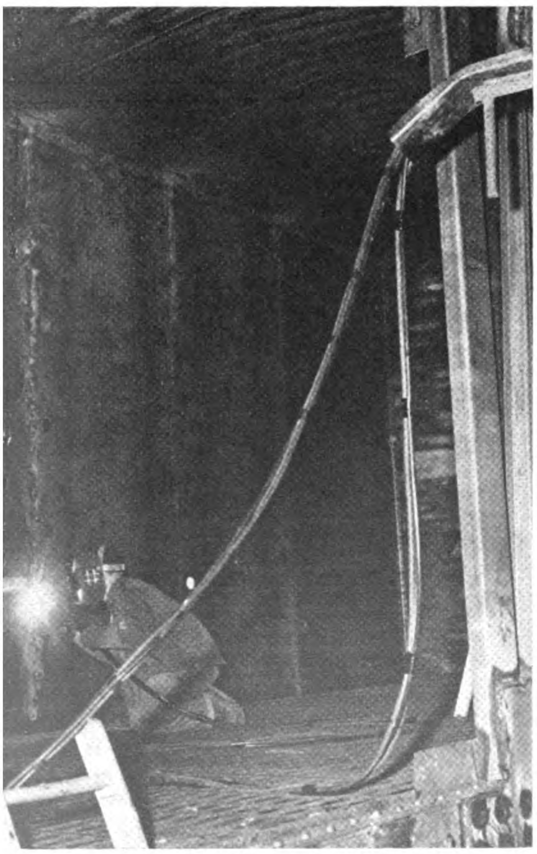
Performance of the preharde... plates in regular service has paralle... the test results. With standard m... ganese steel, abrasive action of s... and other particles tends to cause w... before impacts have completely w... hardened the surface. In contrast ... prehardened metal resists abras... from the beginning. Unlike other ... terials tested in non-lubricated s... ice, manganese-steel plates—stand... or prehardened—tend to develop ... polished, low-friction working surf...

The prehardened liners, in the ... of tests and service to date, are exp... ed to wear up to eight years—ab... twice as long as standard non-h... ened parts and about six times as l... as carbon steel. Wear limits depe... on the type of truck frame and jour... box. In most cases, with frames tr... eling about 10,000 miles per mo... standard high-carbon manganese-... liners have usually been replaced ... four years. Removing and replaci... set of pedestal liners takes about ... hour for each journal. The old ... is burned off, the surface to whic... was attached is ground smooth, ... the new plate is welded on ... stainless-steel electrode. On ... trucks, the liners are bolted ra... than welded. Although prehard... parts do reduce maintenance costs ... frequency of replacement, NYC p... out that substantially increased ... tection of adjacent components ... the basic reason for standardizing ... the new prehardened material.



Remote feeding equipment outside car delivers wire to two operators who are welding vertical seams between side-sheathing panels.

Push-Pull Welding Speeds Rebuilding



Cables are elevated through car doorway to open that area for easy access to interior.

"Push-pull" semi-automatic welding equipment with long service leads has doubled the speed of welding the side and end sheets in 40-ft box cars at the Chicago & North Western shop in Clinton, Iowa. The Sigmatic short-arc units are used to weld the 12-gauge steel sheets to each other and to the Z-bar side posts, replacing the wood sheathing in these composite cars. C&NW officials report that this method is producing better welds and is requiring less subsequent grinding, wire brushing and cleaning. Some 160 linear feet of vertical welding is completed in about 2¼-hr of welding time by two operators. Speed for both horizontal and vertical welds is approximately 24 in. per min, double the speed made by manual coated-electrode welding.

The long service leads make it possible to locate the rod feed equipment outside the car. Operators do not have to move heavy equipment while welding vertical and horizontal joints from one end of the car to the other. Two of the units are used at one station on the production line to weld vertical seams. At another station on the line, two units weld horizontal seams. A fractional horsepower motor at the rod feed equipment pushes the welding wire through cables to the torches. Another fractional horsepower motor at the torch insures uninterrupted flow of wire at a uniform rate.

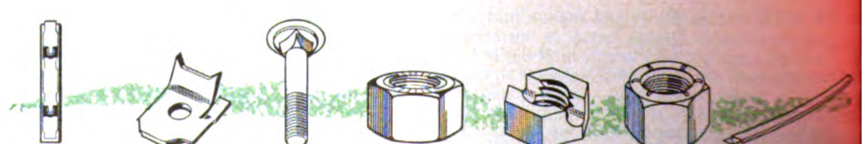
The four Push-Pull units are made by Linde division, Union Carbide. The SW-17 Sigma machines have 50-foot service leads equipped with ST-7 torches. Welding current is 200 amps reverse polarity at 23-volts. Oxweld 0.045-inch No. 65 wire is used. Shielding gas is C-25 argon at 25 cu ft per hr.

Of the 870 composite box cars in the program, 70 were rebuilt using a manual coated electrode welding wire. The balance are being rebuilt using the Push-Pull apparatus. "An outstanding characteristic of short-arc welding with long leads", says the C&NW, "is its very low heat input and consequently very low degree of distortion in handling gauge thicknesses. Short-Arc has eliminated four men from the production line which turns out about six rebuilt cars per day. The rebuilt cars have nailable steel floors and are equipped with roller bearings."

The man in the green blazer has a little gift for you...

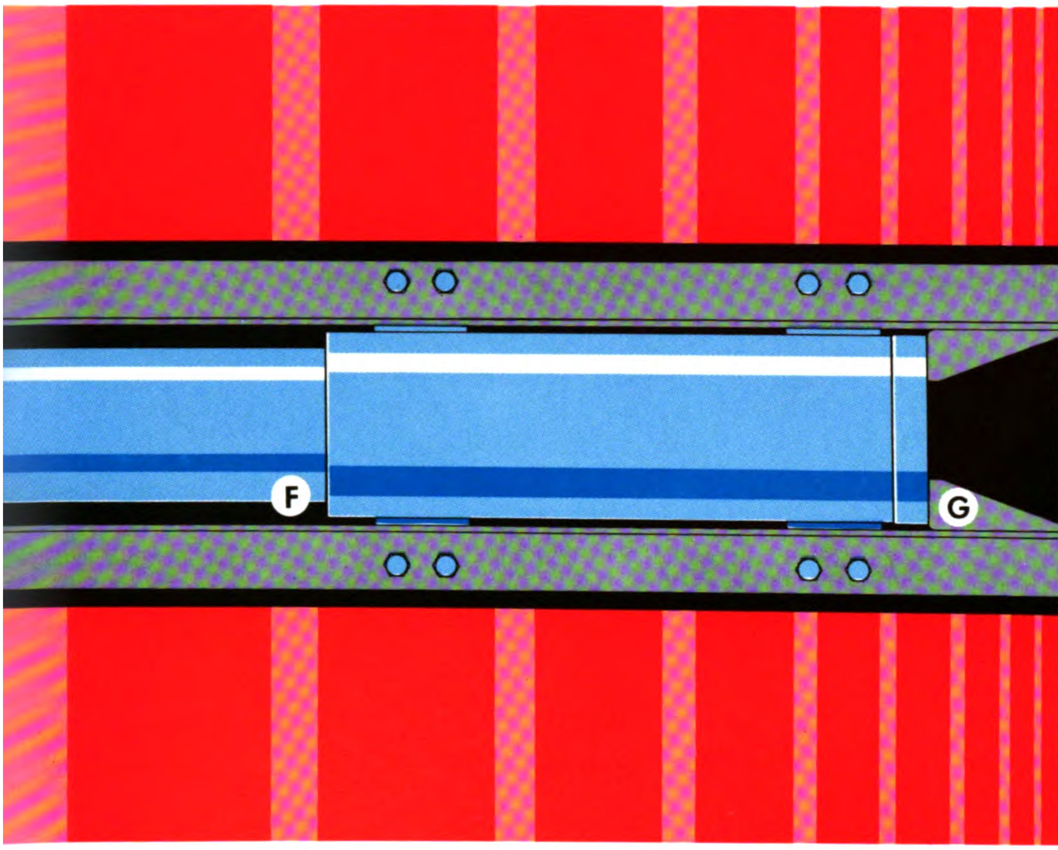
Not everything's big at the railway exposition. Along with the diesels and the rolling stock there are exhibits of the vital little things of railroading. One such exhibitor is MacLean-Fogg—makers of fasteners and tie-down specialties that have been staples of the industry for decades.

Stop in to see the men in the green blazers at the M-F exhibit . . . *Booth No. 3, and the M-F Car at trackside.* When you do you'll receive a useful *little* gift. It's a handy key chain containing examples of M-F products including the brand new M-F Nylon Insert Lock Nut.



MACLEAN-FOGG LOCK NUT COMPANY
Railroad Division
5545 NORTH WOLCOTT AVENUE, CHICAGO 40, ILLINOIS
IN CANADA: THE HOLDEN COMPANY, LTD., MONTREAL


INTRODUCING A BOLD NEW CONCEPT
the M-20
MINER



A Standard Y-40 yoke and E-60 or BE-60HT coupler.

B Special friction draft gear, 22,000 FT-LB capacity.

C Large frame or sill, coupler and draft gear carrier solely for vertical support of components, never subjected to axial loads.

D Tubular guide member to support and align the cushion unit drive rod.

E Long bore, long stroke hydraulic shock absorber mounted immediately behind bolster center filler.

F Cutaway section of standard car underframe 6 ft. behind bolster center filler.

G Set of rear stops which transmit reaction forces in buffing to car underframe.

W. H. Miner's new, highly efficient buffing arrangement provides the ultimate in protection of lading and railroad car structure. The M-20 device combines mechanical and hydraulic shock absorption into one assembly, which smoothly cushions shock between cars at speeds up to 12 mph. It maintains its own structural integrity under severe impact conditions, while guaranteeing cushioning in draft equal to a standard A.A.R. gear.

The M-20 cushions heavy buff impacts through the use of a hydraulic shock absorber coupled in series with a special friction draft gear. When buff loads are encountered, the coupler moves inward, compressing the draft gear and the hydraulic cushion unit serially. The buff load is transmitted to the car underframe smoothly through the cushion gear stops and the rear draft lugs. Results: Greatest lading and shock absorption protection ever attained at moving speeds up to 12 mph.

EASILY APPLIED TO EXISTING ROLLING STOCK

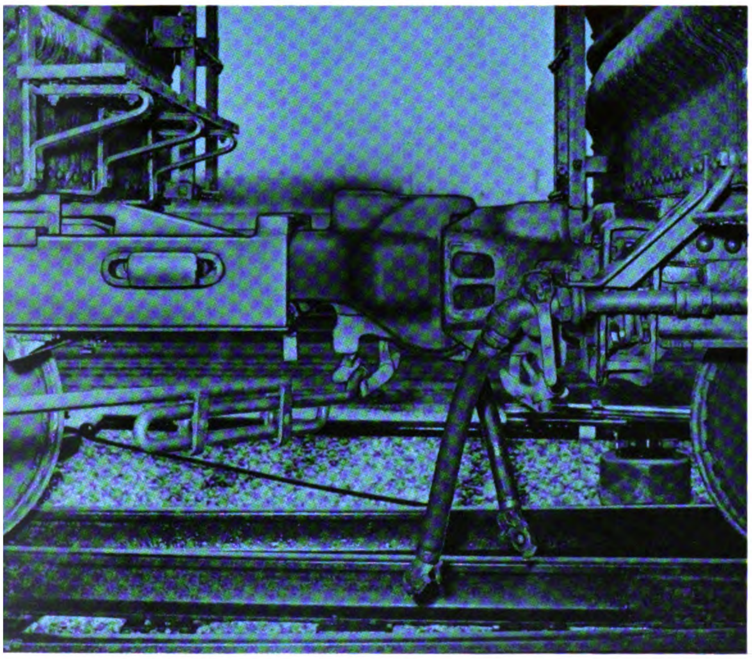
The M-20 Miner unit is readily applicable to existing rolling stock with a minimum of structural modification. Experienced crews can make changeover on old cars in two days.

See M-20 LadingGARD at Railroad Show, Booth No. 743, Track Exhibit No. 1-South

new M-20 device is field proven

With the trend to heavier loads per car, increased train speeds and faster switching operations in yards and terminals, the industry need developed for a modernized shock absorber, bold enough in design to keep tempo with today's railroad operations. Miner's extensive experience and research dedication brought the M-20 into being to fill the railroads' requirements in every practical way.

The new M-20 friction/hydraulic shock absorber combination has been thoroughly tested in Miner's extensive research and development center, as well as proven in field performan by Western Pacific Railroad Co. The W equipped a 70-ton capacity car with the M- and reported complete satisfaction with increas lading protection and ability of the car to ta impacts at speeds up to 12 mph without dama to car's structural members or lading. The ab ity to take short radius curves, the same as standard draft rigging, and rugged durability daily operational performance are additional fea ures of the new design. The M-20 is another bo concept designed to fit specific industry need



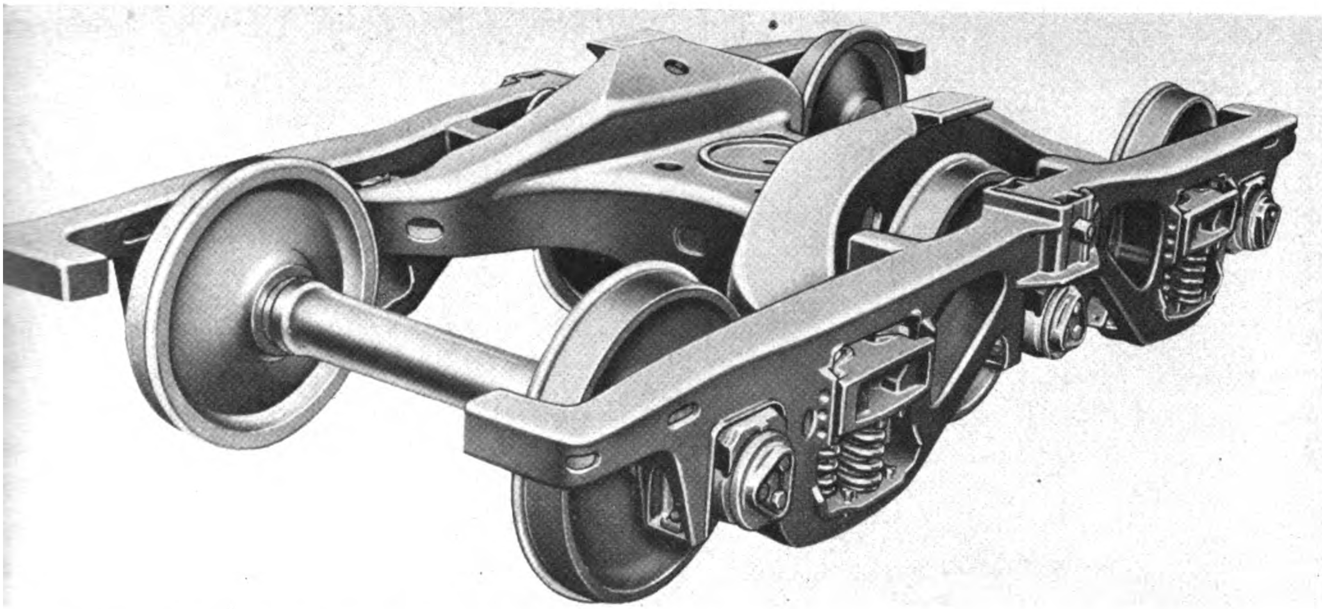
Here's how Miner's bold new concept of shock absorption, the M-20, looks installed. It's a picture of modern progress in protecting railroad lading and car structure.

New M-20 device was thoroughly evaluated at Miner's new Chicago R & D center. Shown here are center's test track, control observation tower and a car used in M-20 tests.

THE MINER M-20 IS IN PRODUCTION NOW

W. H. MINER INC., CHICAGO

OFFICE OF FOREIGN OPERATIONS 1212 Pennsylvania Bldg. 425 Thirteenth St. N.W. Washington 4, D.C., U.S.A.



Frame center lines are 6 ft 7 in. apart. Only two patterns are needed to produce the four portions of two articulated assemblies.

lew Articulation in 6-Wheel Truck

. new principle of side-frame arlation which is designed to keep axles in line at all times is an ortant feature of the six-wheel e Control freight-car truck being oduced by American Steel Found-. A modified ball and socket joint veen the two portions of each side ne controls vertical and lateral tion to provide good riding quali- at high speeds, a major goal of F engineering. Other features in-de built-in snubbing devices, anti-ation bolster stops and wear rings the bolster center plate. The truck designed for high-speed service ler specialized freight cars with acities up to 150 tons. The truck, F officers say, "is for cars with l load up to 197 tons."

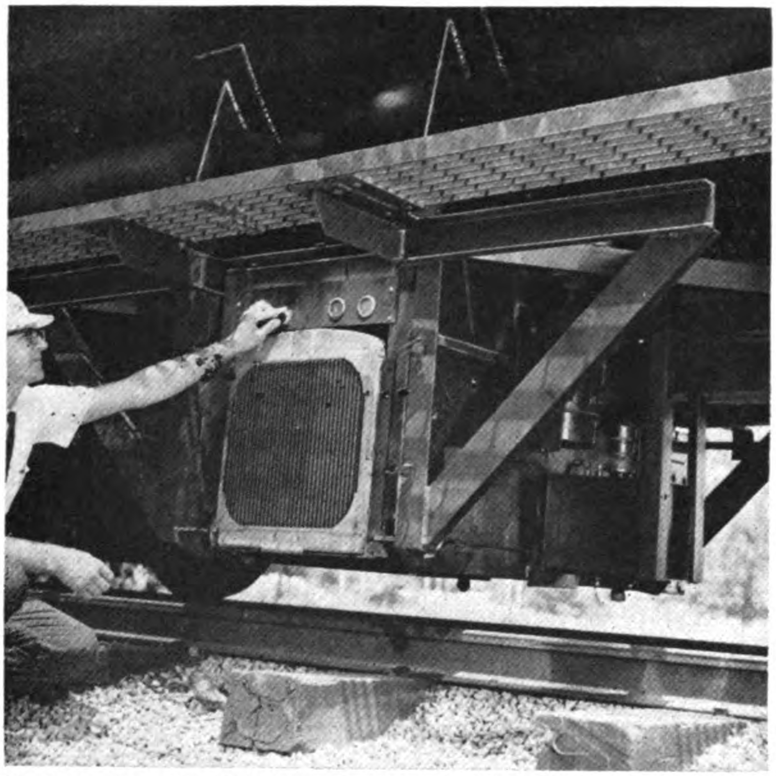
In the application of the modified l and socket joint to control lateral d vertical motion, the spherical seg-nt is welded to the end of the side-me section with two pedestals. The iting socket is welded to the top ier end of the one-pedestal frame tion. In initial tests at ASF's Gran-City, Ill., plant over a curved track, eral motion of the joint kept the les parallel at all times. The truck sily negotiated 155-ft-radius curves.

The six-wheel truck, designed for e only with roller bearings and com-sition brake shoes, may be fitted th 33-, 36-, or 38-in. wheels. It is uipped with 2½-in.-travel springs and ASF's regular Ride Control snubbing arrangement. The complete truck, with wheels and axles, weighs 20,000 lb. The center pair of wheels may be removed without dismantling the truck. The bolster, made of AAR Grade C steel, weighs 5,000 lb. The two-pedestal side frame casting of Grade B cast steel weighs 900 lb. The single-pedestal side-frame portion tips the scale at 800 lb. The truck has a wheel base of 11 ft and is 15 ft 1 in. over brake hanger brackets.

According to C. E. Tack, ASF vice president-engineering, "The truck symbolizes one of the major trends in railroading today—the trend toward larger, more specialized freight cars designed to travel smoothly at high average speeds. Over three years of design, engineering and testing have gone into the truck to meet ASF goals of lightweight, easy maintenance, and assured alignment. Its development was purely on the speculation it would meet future railroad needs. While several railroads have been interested in the truck, there is no guarantee of future orders. In fact, the truck presents a problem and challenge to carbuilders to provide a car to match the truck's carrying capacity."

The six-wheel truck is expected to find application for high-speed handling of bulk commodities in jumbo hoppers or tank cars. Large grain and ore cars and cars for integral coal-train service are seen as possible markets. Acceptance of the truck is bound to be slow, according to Mr. Tack. Capacities of many bridges are insufficient to handle ultra-high-capacity cars, and terminal facilities will have to be modified. Because the six-wheel truck can lower the weight per wheel by spreading the load over six axles, it could permit six-wheel truck cars to go over some bridges where jumbo cars with heavy-duty four-wheel trucks would be prohibited. "There probably will be a place both for the four- and six-wheel trucks under big cars in captive service," Mr. Tack concluded.

Following the six-wheel truck's display at the American Railway Progress Exposition, official laboratory tests of the component parts will be made for AAR approval. The truck will then be applied to a skeleton underframe car, currently under construction by ASF, for road operation in the ASF test train. ASF has formulated procedures based on AAR specifications for tests of four-wheel trucks. The skeleton car with six-wheel trucks is to be placed next to a calibrated four-wheel-truck car to determine ride characteristics at high speed. Each center plate of the skeleton car will carry a 24,000-lb load. Tests will be run over a 50-mile portion of the Burlington between North St. Louis and Old Monroe, Mo.



Diesel alternator with 40-kw rating is mounted inboard of one truck on Shippers car. Fuel tank is inboard of other truck. Smaller units are also being planned.

Temperature control equipment, mounted on end of much like that used on mechanical refrigerator cars.

Temperature Control for Liquid Loads

Tank cars with permanent heating installations which will maintain ladings at specific temperatures during shipment are increasingly popular. The three largest tank-car-leasing organizations now offer such equipment. First introduced for hot-pitch movements last year, cars are now proposed, or in service, for moving such diverse commodities as vegetable, animal and mineral oils; sulfur; chocolate syrup; milk of magnesia; and latex emulsion. Dry bulk commodities could be next.

General American and Union Tank are operating cars on which a liquid heat-transfer medium, heated by a propane-fired burner, is circulated in coils around the tank to maintain desired temperatures. Shippers Car Line division of ACF Industries utilizes electric immersion heaters for the same purpose. In all cases, it means that tank cars must be added to the list of freight equipment fitted with prime movers and temperature-control installations which might, at times, require mechanical department attention.

Late last year the Therm-O-Temp car, a joint development of U.S. Steel, Vapor Corporation, and General American Transportation, was announced. Called "an innovation in liquid-pitch-handling technique" by B. S. Chapple, USS vice president, the car was described as "an answer to many years of research for a practical method of keeping pitch in a hot, liquid state—and ready for prompt unloading when it reaches customers' plants."

In addition to cutting unloading time from 48 hr to 45 min., it also eliminates costly steam facilities which must be provided for unloading the coil-equipped tank cars in which pitch normally moves.

Union Tank has subsequently announced production of Unitemp tank cars varying in capacity from 16,500 to 18,000 gal. These cars, heated by the same Intransit equipment used on the GATX cars, initially were assigned to pitch runs but were to be placed in other services.

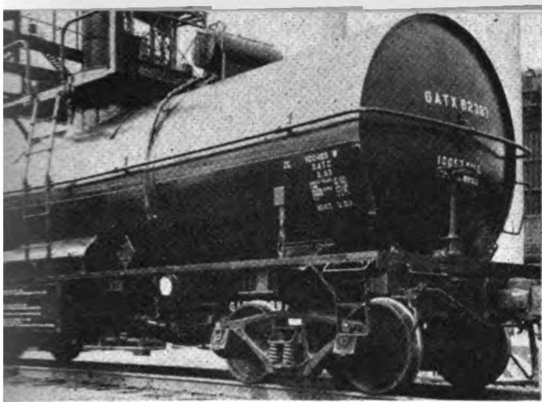
The Intransit 300 mobile heater installations, supplied by Vapor Corp., can maintain temperatures up to 500 deg F on these tank cars. It is a propane-fired system in which an oil serves as the heat-transfer medium. The tank is heated by the hot oil culated through many rows of lel coils welded to its outside surf and covered by up to 6 in. of glass. This heating-coil arrange leaves the interior free of obstruc and distributes the heat evenly the entire surface of the car.

Major components of the unit are the propane fuel sy engine drive, and heat-transfer systems. A 400-gal propane tank plies propane vapor to fuel the en and propane liquid to fuel the hea The liquid propane is vaporized heat from the engine exhaust pro use.

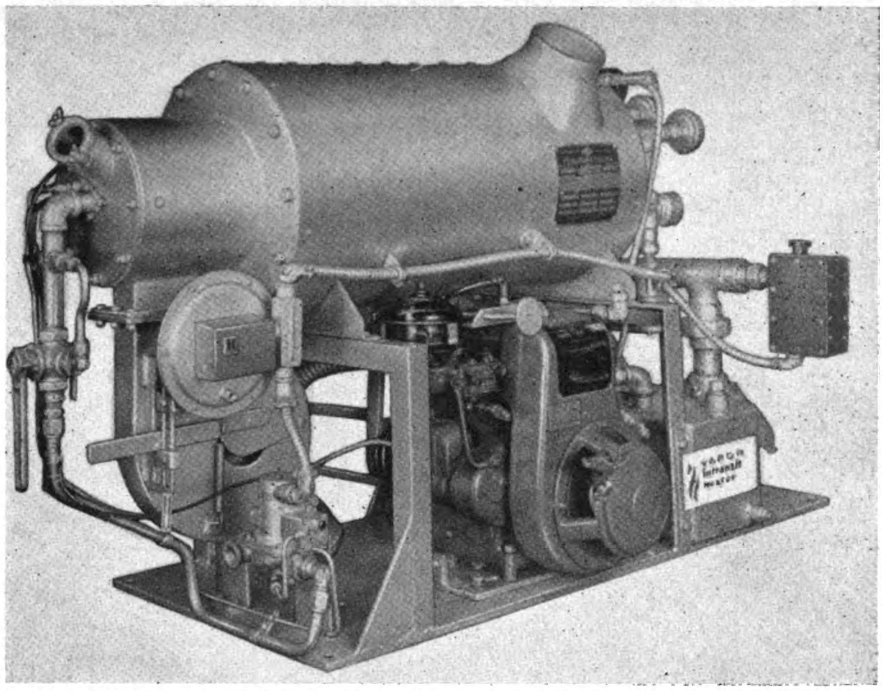
The 5-hp, one-cylinder, four- engine drives:

- The blower which delivers bustion air to the heater;
- A positive displacement, pump which circulates heat tra oil through the heater unit and through the heating coils surround the tank;
- A two-terminal magneto provides ignition for the pilot and the engine.

The system goes into opera when the tank-car lading reaches



rai American and Union Tank cars with Intransit heaters
tted with expansion drums atop their insulated tanks.



Intransit 300 heater is Vapor's largest model. Also available are a smaller engine-powered unit and a still smaller unit for convection circulation.

selected lower setting of the ther-
:at. At this instant the burner
es automatically and the oil is
ed in the fire chamber coils. The
p circulates hot oil through the
:m.

he Intransit 300 has a rating of
,000 Btu per hr. Also available
:ar heater service are the Intransit
, a smaller unit of 150,000 Btu
ıg with a 1-hp engine and auto-
c system operation after engine is
:ed manually, and the Intransit 25,
5,000 Btu model which operates
he thermal syphon principle with-
engine-driven pump and blower.

he Intransit 25 has already been
lied to a 10,000-gal Unitemp car
ı eight runs of heating coil under
. of insulation. Natural draft pro-
s combustion air and thermal con-
ion circulates the heat-transfer
id which is a low-viscosity solution
/ater and ethylene glycol. The sys-
can maintain temperatures up to
deg. F.

n addition to tank-car heating,
ɔor is proposing the Intransit heat-
for application to other types of
‹-material cars and trailers. These
ıld include hopper-car and box-car
lications where the ability to main-
ı exact temperatures in dry bulk
:erials during transit would avoid
wing at destination.

Electrically heated tank cars capa-
of maintaining ladings in transit at
ıperatures to over 500 deg F have been introduced by Shippers Car Line. Two cars are now in service. One is being used by a major food chain to carry liquid margarine from a Southwestern processing plant to a Pacific Northwest distribution center, and the other, leased by a major steel producer, is being used to transport molten pitch to aluminum manufacturers.

Shippers, offering to lease the cars to shippers and railroads, say they may be built in capacities ranging from 4,000 to 20,000 gal.

Bright Future

Commenting on electrically heated tank cars, H. V. Bootes, ACF vice president and general manager of Shippers, said: "We feel there is a bright future for this specialized equipment in industries such as food and chemical processing.

"In addition to pitch and vegetable oil already carried successfully, there is an active and immediate requirement for these cars in carrying such products as corn syrups; sugar syrups; chocolate syrups; drugs, such as milk of magnesia, latex emulsion, formaldehyde, sulfur, and asphalt products," Mr. Bootes added.

Heat is supplied through immersion heaters energized by a diesel-electric alternator—similar in design to the power plants used successfully on mechanical refrigerator cars. A diesel fuel supply carried under the car is sufficient to run the generator continuously for about two weeks. After the engine is set in operation, it is completely automatic, requiring no attention until the car is to be unloaded or put on wayside power at destination. The car's heating system may be operated at an unloading site by plugging into any 220-volt a-c shop line.

The two immersion tubes housing the electrical heaters extend the length of the heavily insulated tank's interior. They may be removed, if necessary, for inspection or maintenance. Thermostatically controlled probes, also in contact with the lading, govern the speed of the continuously operating engine-alternator to maintain constant proper temperature.

The generator has a rated output of 40 kw and is powered by a 4-cylinder, 60-hp diesel. For the safety of the system, several devices have been built in to shut it down in case of malfunction.

For ladings which may be moved at lower temperatures than those that can be produced on the high-capacity prototypes, Shippers has already completed designs of two smaller systems. The prototype cars, equipped with what has been designed as the SCL-40 heating installation with a capacity of 137,500 Btu per hour, may soon be joined by cars with SCL 20 (68,500 Btu per hour) and SCL 10 (34,000 Btu per hour) heaters.

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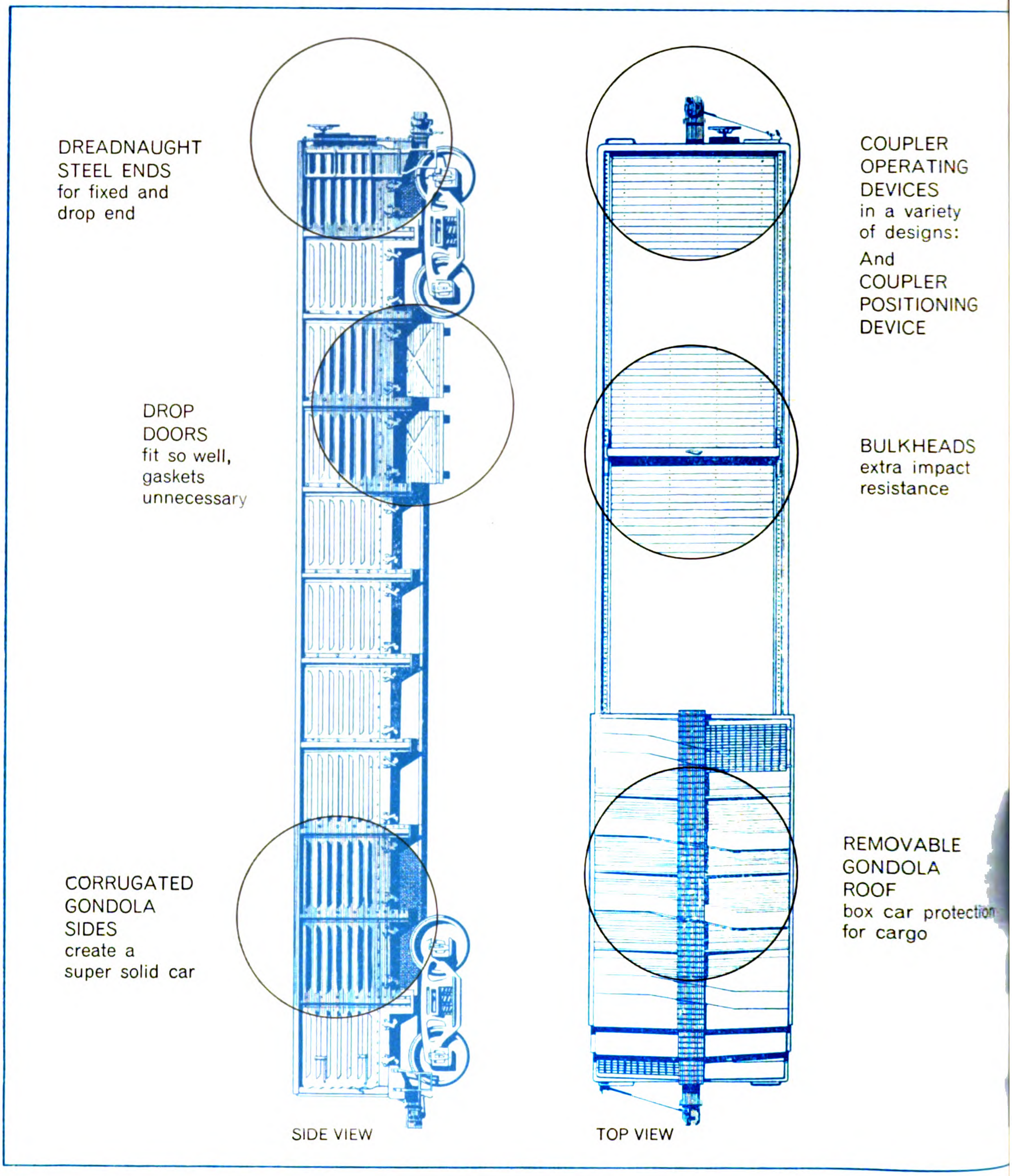

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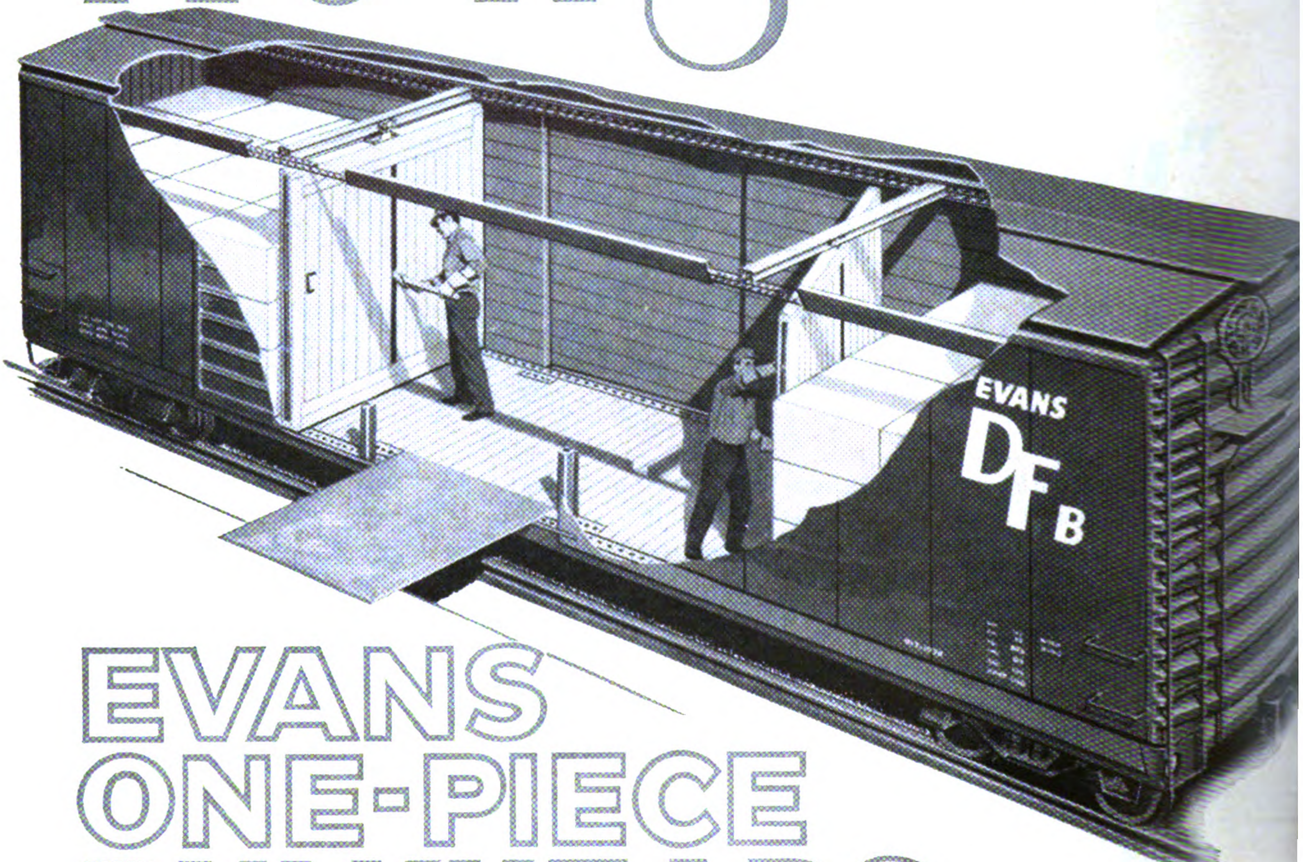

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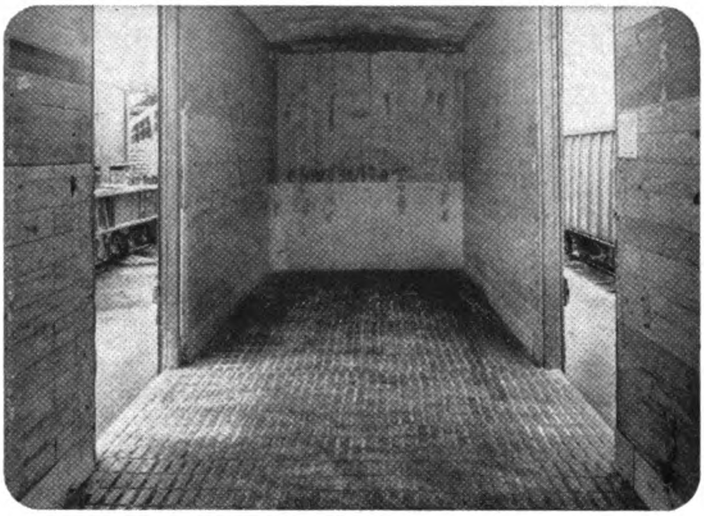

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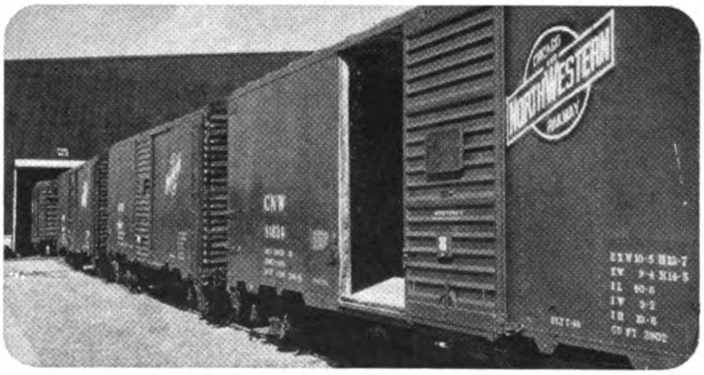

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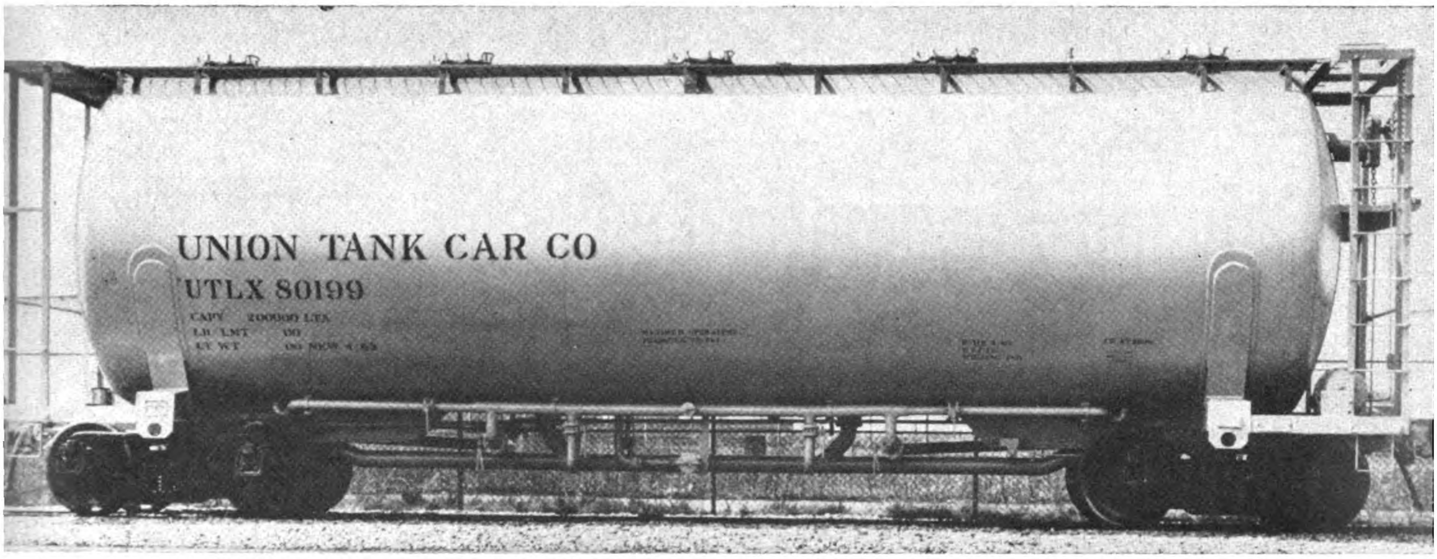
Steel

See the 1st and 100,000th car with N-S-F at the American Railway Progress Exposition in Chicago, Oct. 9-16.



matic system not only discharges 100-ton lading from the car's tank, it also can move the product into storage silos. During a recent test, the ed car was emptied completely in less than an hour.

\ir Pressure Unloads)ry-Bulk Tank Car

\ tank-type car which handles dry k materials that are unloaded by ssurizing the interior has been put) service by the Union Tank Car . The 100-ton car, built to Union's ented HD (Hot Dog) design, has center sill. All buff and draft loads transmitted between the draft sills the tank itself. This construction)licates that used for Union's re-tly built liquid-commodity tank s.

The dry-bulk tank car carries and oads its commodity in a completely sed system, preventing contamina-ı, waste and spillage. In tests at Lehigh Cement Company plant in ıson City, Iowa, 100 tons of cement re unloaded in 44 min by one man, luding 8 min to pressurize the tank. · pressure pushed the cargo through discharge pipe and lifted it 120 ft) a storage silo.

The car is designed to transport nent, bentonite, lime, talc and other nular and pelletized materials and ınload the product into storage bins 1 high-rise silos.

Because cement and other materials npact themselves in transit, the first p in unloading is to aerate the lading it will flow freely through the 4-in. npressor line which is connected h sub-chambers in the hoppers. The chambers are separated from the hoppers by aerating pads through which the air passes.

Standard air compressors, ranging from 600 to 1,200 cfm, can be used with the system. The compressor size depends on various factors, including the type of lading, size and length of the unloading line, and the desired unloading time. Along with the 4-in.-diameter air-supply pipe, there is a 6-in.-diameter discharge pipe. Both pipes, with quick connect-disconnect fittings, enter the car at midpoint on the same side to provide easy access. The valves are installed on this side for convenient operation. There are approximately 35 ft of each size pipe on the car, interconnecting the four separate hoppers.

During the aerating process, the car is pumped to its operating pressure of 30 to 52 lb per sq in. When the proper pressure is reached, the discharge valves are opened and the material flows through the 6-in. discharge line.

The car is equipped with top loading hatches for gravity, or pneumatic loading. Safety valves at the top of the car are set to relieve at 55 lb per sq in. The pressure gauges are enclosed at the body bolster jacking pad extension. The running boards are steel grating type. Other equipment includes Barber stabilized trucks, one-wear 36-in. steel wheels and plain journal bearings.

The new system is said to bypass these mechanical difficulties. Union Tank claims the following advantages:

- Accelerated unloading;
- Minimized trouble because of simplicity of system;
- Increased capacity of existing facilities, permitting more cars to be unloaded.

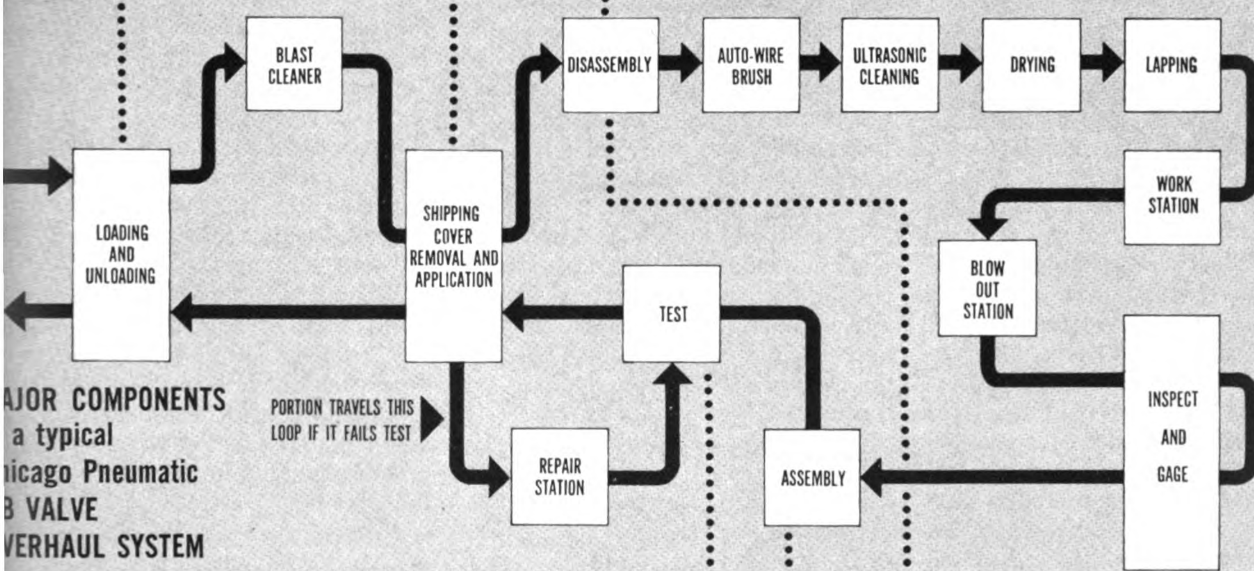
Union Tank officials say the car could "out-mode many of today's material handling techniques." At present, most cement is hauled in 70-ton covered hopper cars which are unloaded by gravity discharge through chutes at the bottom of the car. The chutes usually empty into an elevator-type conveyor belt which carries the commodity to storage. Unloading by this method requires the use of mechanical conveyors and often takes several hours. Frequently, the cement becomes compacted in transit and will not flow through the chutes until it is manually agitated. At other times, when there is moisture in the chutes, the cement at the bottom of the chutes sets and prevents the outlet doors from opening.

Union Tank has concentrated most of its activities on liquid bulk transportation. Among its developments are the 50,000-gal tank car (RL&C, May 1963, page 42) which has, until now, operated only in experimental service. Last month three 38,500-gal cars, largest in interchange, were leased to Atlantic Refining Co.

t Coast Line's, mechanized overhaul hop in Waycross, Ga., AB Valve sets tart their journey at this conveyor oading and unloading station. Each alve set is placed on its own individual carrier . . . next stop, the cleaning area. A typical test section arrangement appears in background.

Removing shipping covers from emergency portions. CP Multi-runners, suspended from overhead balancers, remove cover retaining nuts in seconds.

Emergency portions pass through the disassembly area in a continuous flow. CP Multi-runners keep the line moving on schedule.



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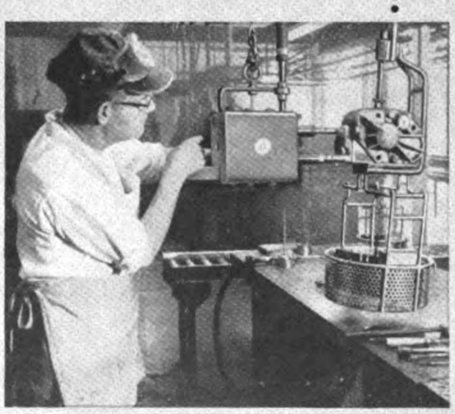


Replacement of check valve covers is handled efficiently as emergency portions move through the assembly station.

General view of disassembly area for service and emergency portions. Multi-runners are suspended at each operating station.

J. J. Dwyer

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Cleaning Lube Oil Coolers

What is a satisfactory method for cleaning Alco oil coolers without removing them from the diesel unit?

C. V. Kalkbrenner

T. A. Tennyson

This will be limited to a method for cleaning the oil side of the Alco oil cooler. Proper water conditioning, including proper control, practically eliminates need for attention to the water side of the heat exchanging surfaces. The method has been satisfactorily used for more than ten years on a fleet of 16-cylinder Alco locomotives in freight service. A number of brands of lubricating oil have been used in these locomotive engines. Indications of need for cleaning the oil coolers have developed only infrequently. Over the years there have been opportunities to make thorough inspections of the interiors of some of the coolers; their condition has always been excellent. The method described involves the use of no steam or water; cleaning can be done without removing the cooler from the locomotive.

The oil side of the cooler tubes is cleaned by circulating a cleaning solution through pipe connections provided at each end of the shell and then removing any residue of the cleaning solution by circulating a solvent and draining. Before such cleaning is started, it is necessary to remove the crankcase oil from the cooler by first draining it in the normal manner and then through the pipe cap in the bottom of the shell's flange, first blanking off the inlet and outlet lines. Obviously the oil cooler must be restored to its original condition before then engine is again started.

Apparatus for this cleaning operation should include a storage tank for the cleaner and another tank for the rinsing oil. The pump should be of suitable capacity and with an adequate motor and flexible connections of sufficient length to reach the top and bottom washing connections on the cooler shell. Preferably it would be mobile so that cleaning can be done at any location where power is available.

The equipment used by the Cotton Belt at the Pine Bluff, Ark., shop is mounted on a dolly. It includes
two tanks with an electrically dri
EMD water pump mounted betw
them and piped to make it possibl
carry on the cleaning that will be
scribed. The tanks each hold ab
60 gallons of solution. One tank c
tains diesel fuel, used for rinsing
other contains a mixture of 50%
sel fuel and 50% lubricating-
sludge - dispersant solvent clea
Either solution can be circulated f
its tank through the cooler, in ei
direction, and back to its tank fo
long a cleaning period as is desire

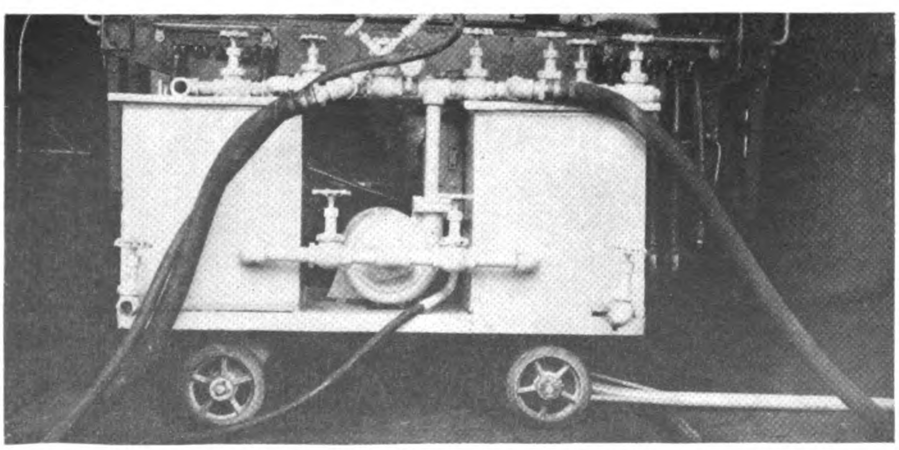
The 1¼-in. piping and fittings
tween the pump and the two tanks
arranged so that the liquid can be
en from either tank by opening
closing the proper valves. The li
is delivered to, and returned from
oil cooler through 1¼-in. inside
ameter steam hose. In practice, li
drawn from either tank is returne
that tank until the cycle is comple
Direction of flow can be reversed w
desired. Pressure is kept at abou
psi, indicated by a gauge on the
charge side of the pump. Motor
2-hp, 1,750-rpm model directly c
nected to an EMD water pump of
type used as the replacement for E
"B" and "C" engines.

While this is not the only arra
ment or group of components w
would do the job, it gives an ide
sizes which have proved satisfac
It is important to insure rapid c
lation of the solution without un
pressure buildup in the cooler du
the washing.

Method used with this equipm

- After draining oil from the c
er and putting in blanking plates, f
cooler with diesel fuel for 10 to 15 m
in the direction of normal lubrica
oil flow. Reverse the direction for
other 10 to 15 min and then drai
dirty diesel fuel into a waste drum
refill the tank with clean fuel t
used later for rinsing.
- Circulate the cleaning solu
through the cooler in the directio
lubricating oil flow for 1 hr. Reve
the flow for 1 hr. Drain solution
tank from which it came.
- Rinse the cooler by pumping
clean diesel fuel through it for 1
20 min., finally returning it to the s
age tank where it is used for ini
rinse of next cooler to be cleaned
- Drain all diesel fuel from co
through the pipe tap in the botto

(Continued on page 87)



Two tanks and pump with motor are mounted on shop truck; valves control phases of process.

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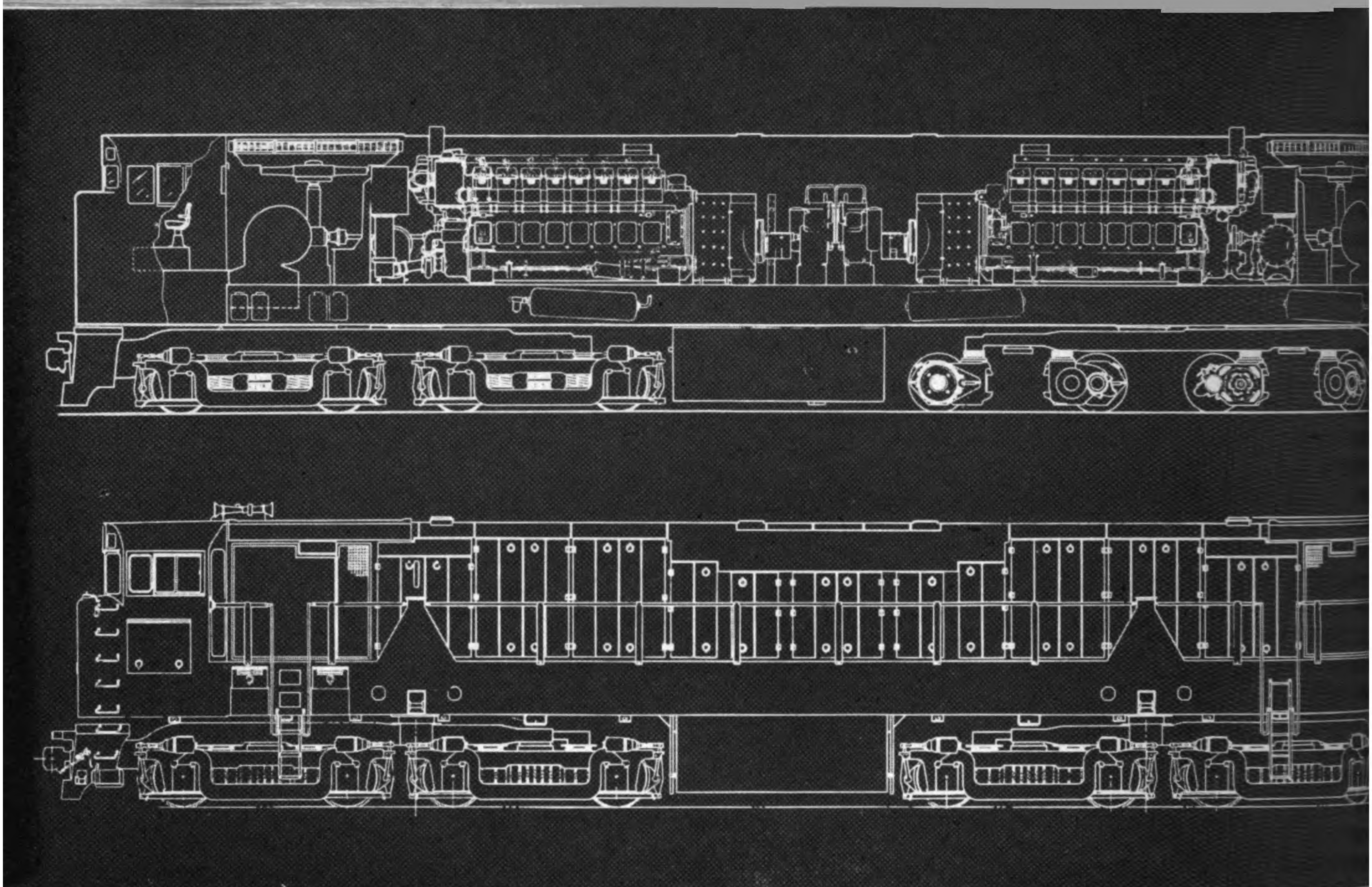

Union Pacific will soon be operating first U50. Unit is 83 ft 6½ in. inside coupler knuckles; has an overall height of 16 ft 10⅞ in. Road couple three for operation as 15,000-hp locomotive. Span-bolster running gear is like that used on early UP turbines.

GE Adds New Domestic Locomotives

U25B model with 2,500-hp rating has been joined by U25 with six motors. First of the 5,000-hp U50's is complete

General Electric's announcement on August 28th of the U25C diesel-electric locomotive, a six-axle version of the U25B, adds another model to the seven new designs already introduced this year by the three domestic builders. In making the announcement O. F. Vea, general manager of GE's Locomotive and Car Equipment Department, also released more information on the previously announced 5,000-hp U50 diesel-electric (RL&C, July 1963, p 29).

Designed for heavy freight service the U25C has the same mechanical and electrical features as the four-axle U25B, first introduced in 1960 (RL&C, June 1960, p 25). With three-axle, three-motor trucks the U25C, however, has a continuous tractive effort rating of 79,500 pounds or 56.5% more than the U25B's 50,800 pounds. Weight has been added to the U25C and a comparison with the U25B can be made by reference to the accompanying table.

Three of the U50 units, ordered by the Union Pacific, will provide a 15,000-hp double-ended locomotive capable of replacing as many as 10 older low-horsepower diesel-electric units in mainline freight service.

The U50 also has many of the features and much of the equipment of the well-known U25B. Two complete 2,500-hp diesel-electric power plants and an operator's cab are contained within the overall length of 83 ft 6½ in. In operation, the two engine systems react in the same manner as any two conventional locomotive units in multiple.

The locomotive is geared for a maximum speed of 70 mph and develops a continuous tractive effort of 106,000 pounds at 14.7 mph. Total weight of the locomotives, including dynamic braking equipment and 5,850 gallons of fuel, is 55[illegible] pounds or 69,500 pounds per a[illegible]

The running gear consists of [illegible] 2-axle swivel trucks arranged in p[illegible] under two cast steel span bols[illegible] giving a B—B+B—B wheel arra[illegible]ment, the same as the Union Pac[illegible] 4,500-hp gas turbine electric loco[illegible]tives. As a result, the rigid wheel[illegible] is only that of a conventional two-[illegible] truck. Couplers and draft gear, as [illegible] as the front pilot, are mounted on [illegible] span bolster; an arrangement w[illegible] minimizes the swing-out of the co[illegible] on curves.

The two diesel-electric power p[illegible] are completely independent in [illegible]ation, each furnishing power to [illegible] four motors on the two trucks [illegible] one span bolster. Each power [illegible] consists of a General Electric FD[illegible] turbocharged, 4-stroke cycle, [illegible] diesel engine direct connected [illegible] GT598 traction generator, the [illegible]

ver package as used on the 2,500- U25B and U25C locomotives. The ction generator is separately venti- :d, from the back to the front, with aned air from the main air duct tem. Following the design concept he U25B locomotive, all auxiliaries mechanically driven. A shaft ex- sion from the traction generator ves the air compressor at engine ed. From the opposite end of the sel engine a shaft drive with flexible iplings connects to a right-angle r box having three output shafts, ich is located in the radiator com- tment. A vertical shaft drives the izontal airfoil-type radiator fan. o horizontal shafts drive centrifu- blowers, one on each side of the npartment, to provide ventilating l engine combustion air.

Each power plant has its own pres- ized electric control compartment ated under the platform on the right : with gasketed doors, providing dy access for maintenance. Air ke equipment is accessible through ilar doors below the operator's cab. : storage battery and air reservoirs located under other portions of the : walkways. Four sand boxes, lo- :d under the walkways at the body sters, have fillers incorporated in side handrails.

The locomotive has the general figuration of the road switcher : with walkways on either side of apparatus hood; the operator's cab :nds the full width of the platform he front end. For good visibility cab has a pair of large windshields over a short, low nose containing vy collision posts. The nose hood :ains the toilet, water tank and :er. Auxiliary electric heaters are ted in front of the engineman and nan, and on the back wall of the to supplement the hot water sys- in case of engine shutdown.

uel capacity of the U50 can range veen 3,400 and 5,850 gallons. The units to be built have a 5,850- on tank which is integral with the orm structure. Nearly half of the is carried between the sills in the orm, the balance being in that ion of the tank extending beneath platform in the space between the bolsters. For lesser fuel capaci- a single tank beneath the platform be used.

ir for both ventilation and com- on is cleaned by primary inertia- filters located beneath the cen- gal blowers. Engine combustion

Six-motor U25C was first delivered for California construction operation. Atlantic Coast Line has ordered four for fast-freight service on its Richmond, Va., to Florida main line.

air passes through a secondary inertia-type cleaner before entering the turbo-charger. Portions of the space between the locomotive platform sills above the fuel tank serve as ducts for generator cooling air. Cleanliness of the control compartments is assured by pressurizing them with cleaned air; the engine cabs are pressurized by exhaust air from the main generators.

Engine cooling radiators are mounted horizontally in the cab roof at each end of the apparatus hood and are arranged to drain to the supply tanks when the engines are shut down. Air flow is controlled by pneumatically operated shutters above the radiators and by eddy current clutches in the fan drives. A water-to-water heat exchanger between the two engine systems protects a shutdown engine with rejected heat from the other.

General Characteristics

	U25B	U25C	U50
Horsepower for traction	2,500	2,500	5,000
Traction motors	4	6	8
Wheel arrangement	B–B	C–C	B–B+B–B
Wheel diameter, in.	40	40	40
Gear ratio	74:18	74:18	74:18
Maximum speed, mph	70	70	70
Minimum curve radius, ft	150	273	274
Tractive effort, continuous, lb	50,800	79,500	106,000
Length inside knuckles, ft-in.	60–2	64–6	83–6 ½
Height over-all, ft-in.	14–7	15–0	16–10 ⅞
Width over handrails, ft-in.	10–6 ½	10–6 ½	10–6 ½
Wheel base, ft-in.:			
Each truck (rigid)	9–4	13–0	9–4
Total locomotive	45–6	49–10	68–1
Weight fully loaded, lb	252,000	348,000	556,000
Fuel capacity, gal	1,700	1,700	5,850*
Sand capacity, cu ft	32	32	60

*Maximum

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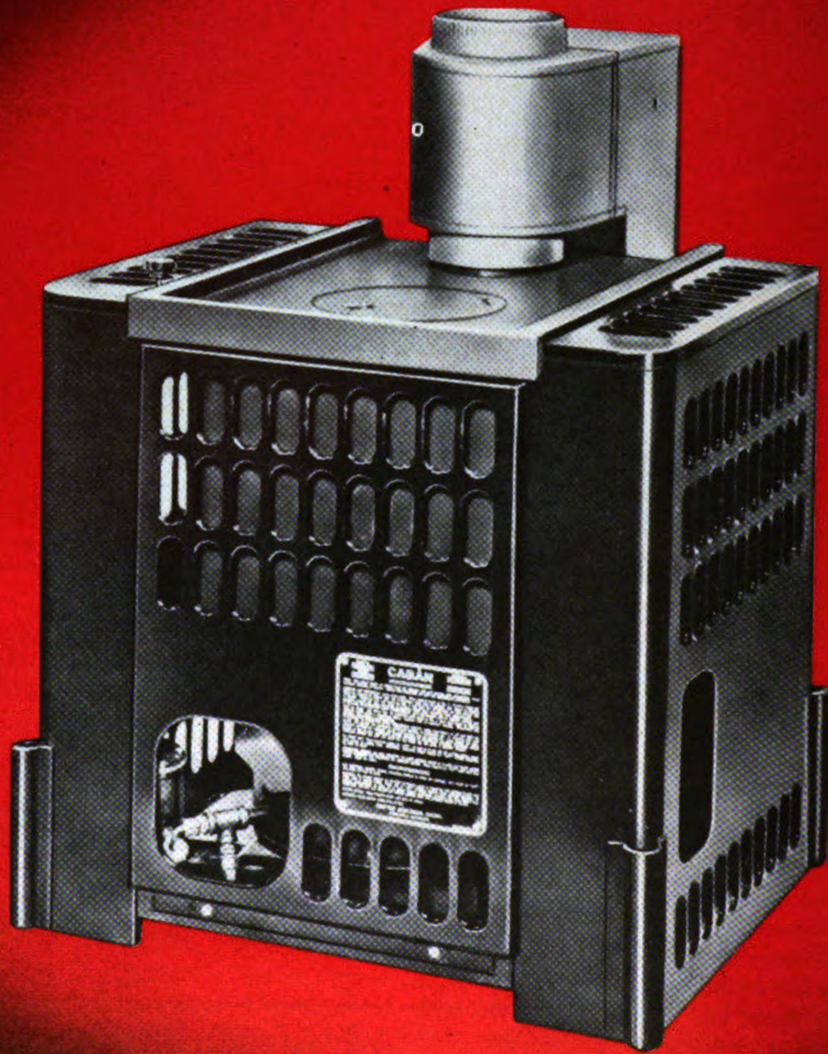
FOR A CABOOSE



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OFFICES IN PRINCIPAL CITIES

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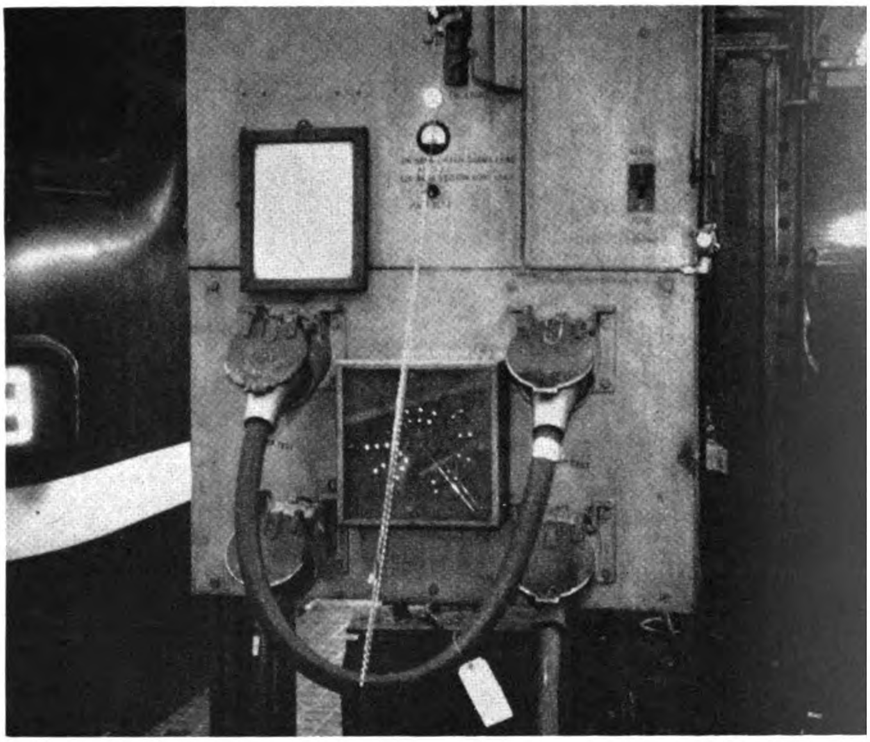


Test panels for control jumpers are installed on platforms in locomotive shops adjacent to the spots where units receive electrical inspections. Chain, operated by air-powered windshield wiper motor at top, moves cable while it is being tested. Glow tubes, which indicate condition of individual conductors, are arranged on panel board at center.

n electronic tester for control ›er cables used between diesel-ric locomotive units has been de-›ed by the New York Central ıanical department. With this :e it is possible to detect faults een conductors, find open cir-, and determine if conductors inadequate current-carrying ca-:y.

ımpers are tested every 90 days to ›ly with ICC requirements and be subjected to additional tests at time that defects are suspected.] has these testers at its major lo-›tive maintenance points — Har-, north of New York City; DeWitt yracuse, N.Y.; and Collinwood, of Cleveland, Ohio. The testers ınstalled on the locomotive shop : platforms. The jumper test is phase of the spot overhaul system h the NYC uses for diesel-loco-ve maintenance (RL&C, June !, p 21).

he tester consists of two sections e electronic portion which detects ation breakdown and current leak-›etween conductors, and the load portion. The electronic section, gized by a 600-volt power supply, esigned to apply variable fre-ıcy, high voltage test currents ıe jumper conductors to indicate :ondition of their insulation. Load ıg consists of passing currents of › 80 amp through the conductors to determine their current-carrying capabilities. The components are mounted on the rear of a panel board, on the front of which are four receptacles into which the jumpers are plugged for test, an ammeter for reading load-test currents, a battery of 54 glow tubes which indicate the integrity of each of the 27 jumper conductors, and the main circuit-breaker-type on-off switch.

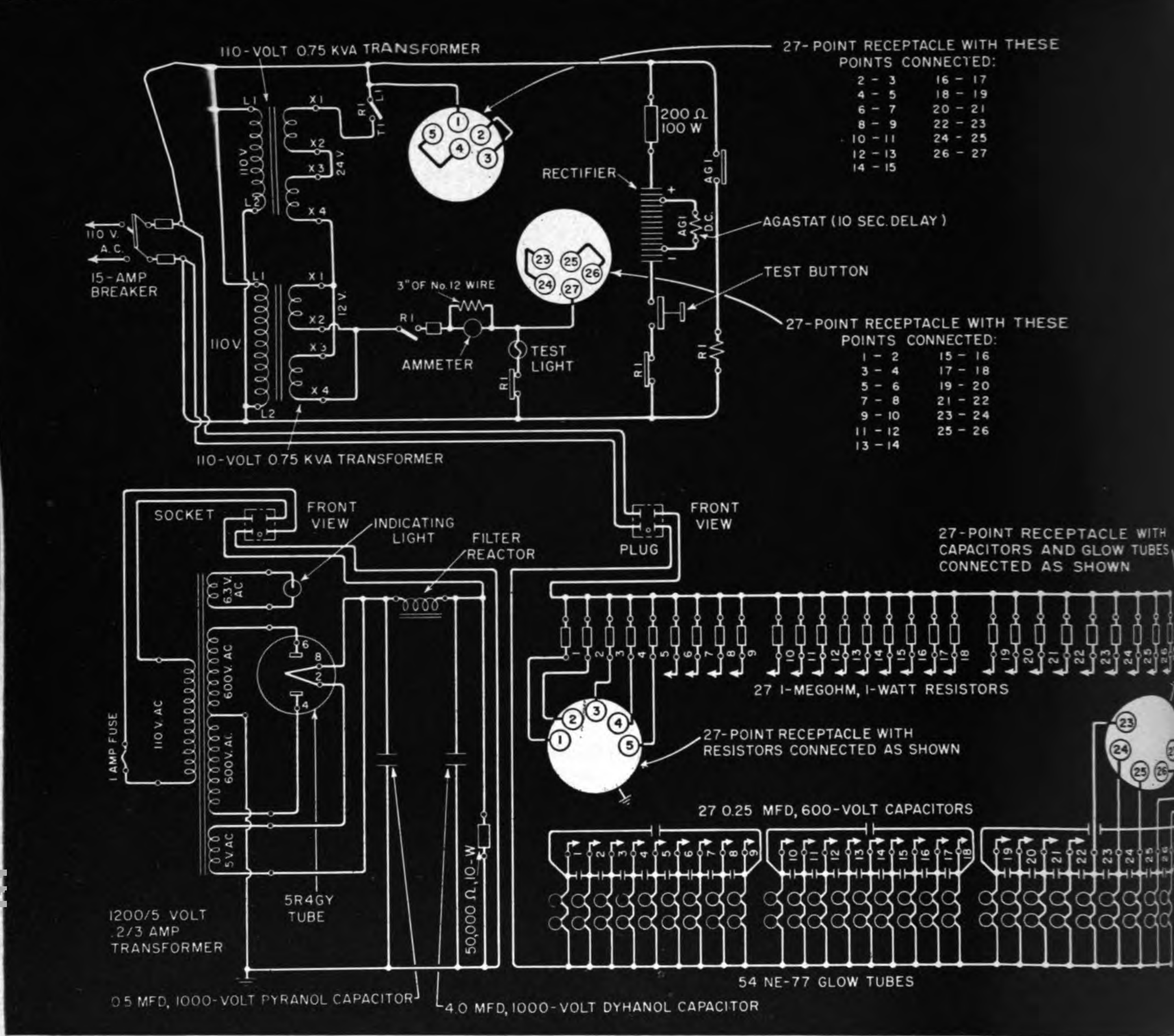
Test Procedure

When a jumper is to be tested, it is first examined for external damage. All the contacts in both plugs are then cleaned, using a $\frac{5}{16}$-in. diameter soft wire brush brazed to the blade of a saber saw having a $\frac{7}{16}$-in. stroke. The brush is the type used for cleaning automobile-engine valve guides.

Cleaned and inspected, the jumper is plugged into the upper pair of 27-point receptacles for insulation and ground testing, the electronic phase of the two-step procedure. Energizing the transformer primary of the 600-volt power supply serves to charge the 0.25 mfd capacitors which are connected between adjacent circuits. In series with each conductor are a 1 megohm resistor and a pair of NE-77 glow tubes. Charging of the capacitors continues until the two glow tubes in series in each circuit begin to flash. This occurs at approximately 350 volts because the NE-77 lamps individually begin to conduct at 160 to 180 volts if the center lead of the lamp is not used, as is the case here. The circuitry puts all 27 conductors into oscillation at random frequencies of 7 to 10 cycles per second, carrying voltages from 0 to 325 volts.

Any leakage or breakdown between conductors will be indicated because the glow tubes either will not light, or will flash only about once a second instead of 7 to 10 times per second, as is the case with a conductor having good insulation and no ground. A grounded conductor will also be indicated by the pair of lamps in its circuit which will remain dark. At the same time, the adjacent glow tubes will flash with extra brilliancy. When all glow tubes are observed to be flashing at the usual frequency and brilliancy, the jumper is known to be free from grounds and even resistance crosses of up to 400,000 ohms.

After passing this test, the jumper is removed from the upper receptacles and is plugged into the two lower receptacles. Contacts in this pair are wired so that all the jumper conductors are placed in series. A test button under the ammeter is pressed to bring in a 10-sec time-relay, energizing the low-voltage transformers which cause an 80-amp current to flow through the jumper conductors for 10 seconds. Any reading much below 80 amp in short



Wiring diagram includes both current test section (top) and insulation test section (bottom). System feed is 110 volts a-c.

jumpers indicates high resistance or, possibly, broken strands in the conductors. With this amount of current, and if more than two thirds of the strands are broken, the conductor will burn open and there will be no reading on the ammeter. When long jumpers—such as those used between road-switcher and carbody type units—are tested, currents then will be lower. The ammeter face has been marked to indicate the range of satisfactory values for these.

The ammeter scale used for reading currents carried by jumpers under test has been painted with yellow and green zones to indicate the "OK" areas for the long and short jumpers, respectively. This meter, connected so that it reads half the actual current value, has a 0- to 50-amp range, full scale. The 20- to 30-amp region, painted yellow, indicates a satisfactory condition for jumpers up to 108 in. long. The 30- to 43-amp range, painted green, is the acceptable range for the shorter jumpers.

Components

Major components used by NYC in constructing its jumper testers are: four Pyle-National 27-point receptacles, Model WWRB-527, with contact units; two 110-volt, 0.75-kva Westinghouse FR 30-TY EP, 60-cycle, single-phase transformers (current test); and one 1200/5-volt, 0.2/3 amp Westinghouse PC-8414 transformer (insulation and ground test). Remainder of parts are components stocked by NYC for locomotive maintenance or readily available from electronic-parts suppliers.

Other components in the cu test section include: Rectifier—V Model 45595190; Agastat (whi connected across rectifier) — E Stop Nut Type ND-21-A with a volt coil and incorporating 1 time delay; Spring-return test b — Cutler-Hammer Model 102 1006A; RI contractor — Squa Class 8502, Type DO-1 with 115 coil and two normally closed i locks. Ammeter is Weston M 517-0 with 50-amp scale.

In the insulation and ground portion of the tester are these ponents: Pyranol capacitor — 23F325 (0.5 mfd, 1,000 volts); hanol capacitor—GE T-10040 mfd, 1,000 volts). Small conde are Cornell Dubilier type PM-6 (0.25 mfd, 600 volts). Indicating is Dialight 531310-995.

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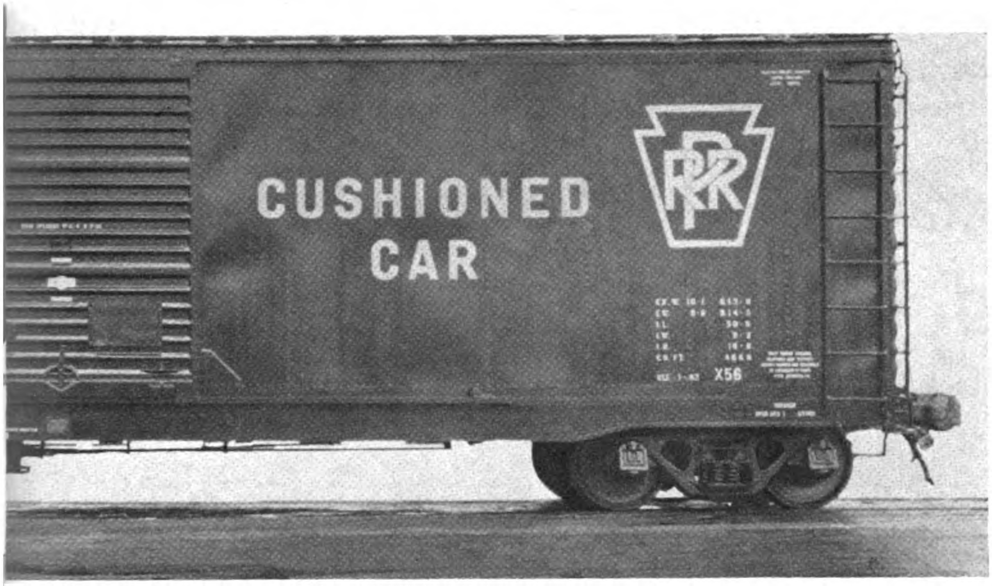


- **Operation**
- **Inspection**
- **Servicing**

HYDRAULIC CUSHIONING

Iydraulic cushioning has won over-elming acceptance. About 75% of box cars ordered in 1962 were ipped with such impact absorbing ipment. In 1963 some builders' -car orders have specified these in-lations exclusively. It is also sig-cant that increasing numbers of er types of railway cars—refrigera- storage mail, conventional flat, vy-duty flat, and piggyback flat — now being fitted with hydraulic ioning.

'hose responsible for car inspection car maintenance daily are coming contact with hydraulic cushioning, er installed as a pair of duplicate ces in the two ends of the car, or single unit incorporated in the er of a sliding sill extending from end of the car to the other.

'ushion underframes are not new. rs ago it became apparent that the gy-absorbing capacities of friction rubber devices which could be in-orated in conventional freight-car t-gear pockets were inadequate to ent damage to certain ladings and uently—in cases of overspeed im-s—to the car structures as well. led to development of the sliding-oncept with higher capacity, long-ravel energy absorbers of tradi-l design installed in the centers of rather than at the ends. Experi- has shown that, until very long l and hydraulic absorption de- were adopted, even sliding sills ld not provide a consistent solution ding damage problems.

Hydraulic systems, which have the ability to incorporate optimum energy-absorbing characteristics throughout an extended stroke, have been the real key to successful damage-reduction in the freight cars put into service to handle fragile ladings. Six of the devices currently offered are placed within sliding sills and two are designed for end-of-car installation. In every case, car owners and shippers have reported dramatic reductions in claims and losses.

Such results, insuring customer satisfaction, are not achieved inexpensively. Hydraulic cushioning installations currently being purchased represent up to 20% of the cost of a new freight car. "Cushioned underframes are not in the same ball park with draft gears" one industry spokesman put it recently. "Cushioned underframes will probably require more frequent inspection and maintenance than draft gears. However, the tremendous savings in lading and car damage make this additional inspection and servicing more than worthwhile."

How can improper functioning of the various hydraulic systems be detected? One of the most obvious indications would be reports of damage to ladings moved in a particular car. It should be remembered that in the case of normal sliding sill installations, the car—in addition to its hydraulic cushioning—is protected by conventional draft gears back of the couplers. For an inspector, the best external indication of malfunction would be that any of these devices have failed to return to their normal positions shortly after having been subjected to impacts. In the case of sliding-sill cars, approximately equal lengths of the movable sill should be extending from both ends —one manufacturer gives a 2-in. tolerance. In the case of end-of-car units, coupler position could serve as a reference. Evidence of excessive fluid leakage around the hydraulic unit is an indication of existing or impending trouble.

Some manufacturers warn that failure of a sliding sill to center after impact could be an indication that the sill itself has been bent, preventing the return mechanism from functioning as intended. It is also pointed out that when the entire car is to be raised, jacks or slings should not be placed under the ends of the sliding sill, because this could result in bending.

Uncoupling devices and flexible brake pipe hoses on these cars should be watched. Center-plate applications on sliding-sill cars, differing from those on conventional equipment, should be checked.

Information on eight devices now being offered appears on the following pages. In most cases, service to date has not indicated specific maintenance procedures. In every case, manufacturers are ready to advise or assist railroads on inspecting, trouble-shooting, and maintaining these hydraulic devices. Reports of malfunctions also may be requested by car owners.

CR Hydraulic Cushioning

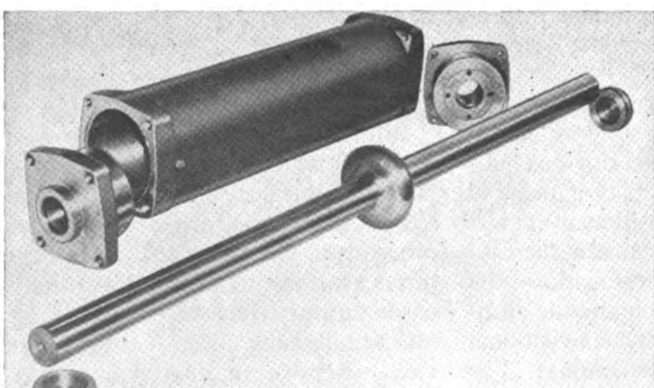
A. O. Smith Corp.

The C-R hydraulic Cushioning system, incorporating 20-in. travel in each direction, consists of a hydraulic unit, return spring, and hardware for application of sliding sill in the car underframe. The double-acting piston is the only moving part of the hydraulic cushioning unit. Energy absorption is achieved by metering of fluid through an annular clearance between the piston and the contour-bored cylinder walls. Beginning at center position, any piston movement within the cylinder forces the hydraulic fluid through the annular orifice. As the piston moves toward either end of the cylinder, the contoured bore gradually reduces the orifice area at a pre-determined rate, forming the variable orifice necessary for proper cushioning. Extra-long bronze piston-rod bushings, secured in the cylinder heads, assure accurate alignment of the piston within the cylinder. Seals consist of a high-pressure metallic inner seal and a low-pressure neoprene outer seal separated by a bleed-back chamber. Protective boots shield the chrome-plated piston rod at each end of the unit. Wiping and sealing rings prevent dirt from entering the hydraulic chamber. A spring system toward one end of car restores the device to its neutral position.

MAINTENANCE. Experience with the device has not yet established fixed maintenance intervals. Fluid capacity of the system is 12.5 gal of 10W or HT oil. Should the system require replenishment of the fluid, it is done through two fill plugs at the top center of the cylinder. Location of these plugs automatically controls the oil level during filling. Replacement of seals and inspection of interior features of the hydraulic cylinder may be done by removing unit from the car and draining it.

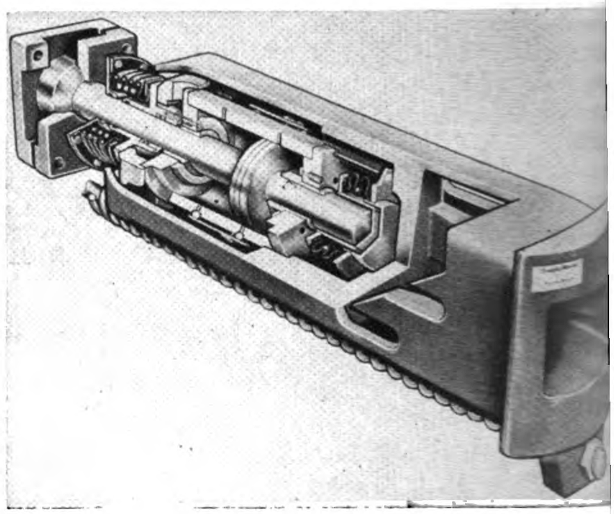
Unit was developed and is manufactured by Buckeye Steel Casting Co., with A. O. Smith Corp. holding exclusive U. S. sales license. Apex Railway Products Co. serves as the A. O. Smith national distribution agency.

Information on maintenance is available from Rail and Advance Products Div., A. O. Smith Corp., Milwaukee.



FreightMaster

FreightMaster Division



FreightMaster, installed in both ends of the conventio center sill outboard of the bolsters, transmits coupler f ces through its outer housing and hydraulic cylinder s tem to the car structure. The hydraulic system, consist of high and low pressure chambers connected by val and ports, is completely filled with hydraulic fluid. T compensator, a semi-evacuated bellows device in t coupler end of the housing, "gives" under fluid impa piston shaft displacement and temperature changes to a sure that system will always be completely filled witho developing excessive pressures. Re-positioning sprin beneath and in parallel with hydraulic unit return Freig Master to a normal position. Housing, which moves with sill, is positioned by two standard draft keys and is su ported by a carrier. Back-stop plate attached to cent filler provides bearing for a special self-aligning u which, through a ball-and-socket arrangement, suppo the rear of the piston shaft to assure its alignment und angular impacts. In operation, cylinder closes on t piston to force oil from cylinder into the outer housi through small metering ports in cylinder walls which co trol fluid released, producing energy-absorption. Oil is i stantly returned behind the piston through ball-type che valves in the cylinder end plates so that cushioning in bo directions is always available.

MAINTENANCE. At the 48-month brake-cleaning inte vals, it is suggested that keys be pulled and nut tying r storing mechanism to unit be removed so that the Freig Master may be pulled from pocket to detect excessive we or damage to dust boot covering rear working area shaft. If there is excessive oil on the carrier plate, it m indicate seal damage. FreightMaster is sealed at assemb and, if there is evidence of internal damage, it will be ne essary to return the unit to the manufacturer.

Additional maintenance information may be obtai from FreightMaster, Box 2325, 424 W. Vickery Blv Fort Worth, Tex. 76101

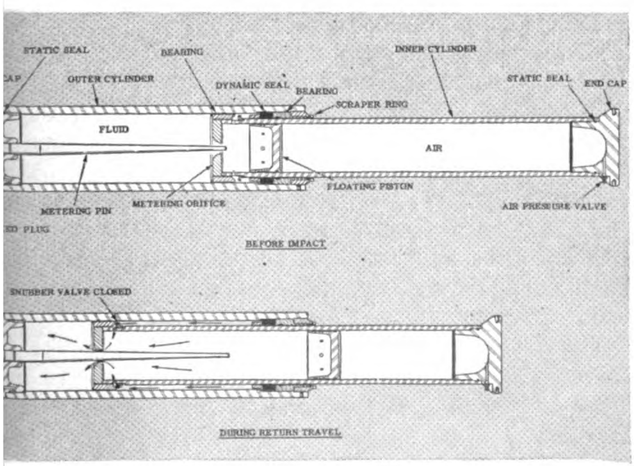
reight-Saver

ıerican Car & Foundry Division

: Freight-Saver center of the car sliding sill cushion :, available in two models for 20- or 30-in. travel, con- s of an outer cylinder in which is installed a tapered ering pin and an inner cylinder having at its end an ice plate through which the metering pin passes. With- he inner cylinder is a floating piston serving as a barrier ween oil and the dry nitrogen gas that serves to return assembly and sliding sill to the neutral position after an act. As the cushion unit starts to compress during im- t, energy is dissipated by forcing fluid through the ori- to the low-pressure side of the chamber. As the over- length decreases, the floating piston moves toward the npressed column of nitrogen. A snubber valve in the l of the inner cylinder near the orifice end serves to w a portion of the hydraulic fluid into the annular space ween the inner and outer cylinder walls. On the return ›ke, this oil is metered back through a smaller aperture, wing return velocity to a value that eliminates rebound he cushioning system.

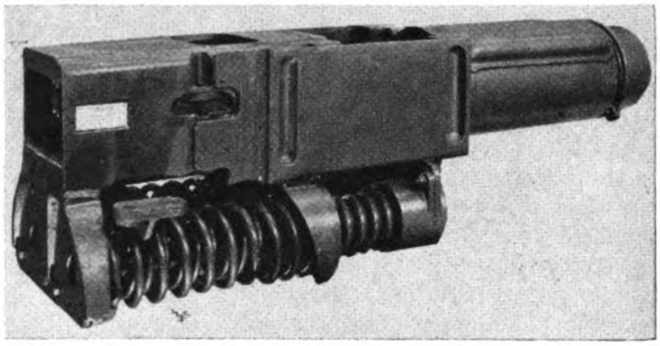
MAINTENANCE. Experience to date indicates no specific erval for maintenance. Inspection should show that ling sill is centering properly and that there is no evi- ıce of fluid leakage around the hydraulic unit. Nitro- ı pressure may be checked through the high-pressure valve installed at the bottom end of the inner cylinder l reached through an access hole in the bottom cover te. If a suitable pressure gauge shows a low reading, system may be recharged with dry nitrogen, or filtered, ed shop air. Valve core should be checked for leakage er recharging. When fluid leakage is detected, car ›uld be shopped for replacement of hydraulic unit. ere has been no incident reported requiring replenish- nt of hydraulic fluid. Hydraulic unit is to be returned manufacturer for repair.

A maintenance bulletin, "ACF Freight Saver Center ! Cushion Unit—Operation and Maintenance Instruc- ns," is available from American Car and Foundry Div., :F Industries, 750 Third Ave., New York 17.



Hydra-Buff

A. O. Smith Corp.



The Hydra-Buff hydraulic cushioning unit is an end-of-car device rigidly mounted in special pockets built into each end of the center sill where conventional draft gears would normally be installed. The energy-absorbing system is a double-acting, single-ended hydraulic cylinder with a 14-in. travel between stops—12 in. in buff and 2 in. in draft. Cylinder is in parallel with a heavy-duty return spring system. The hydraulic system features direct fluid metering—oil flows directly from the high-pressure chamber to the low-pressure chamber through metering grooves of varying lengths in the interior wall of the cylinder. Piston has pressure relief valves to smooth high-pressure peaks developed during over-speed impacts while providing adequate cushioning at low-level impacts. A compensator at inboard end of unit adjusts to fluid volume variations caused by temperature changes and cylinder stroking. Very low-pressure orifices connect the compensator to the main hydraulic system. Return spring system is preloaded in neutral to eliminate "hunting" in trains. Spring design assures immediate return of cushion to neutral and positive cushion capacity in any impact. Built-in mechanical stops are integrally aligned, preventing "bottoming" of hydraulic system.

MAINTENANCE. Service experience to date has indicated no definite required maintenance pattern. The hydraulic system operates completely full on 10W or HT oil. The fluid level may be checked in a sight glass located in the air side of the compensator which comprises the inboard (bolster) end of Hydra-Buff unit. Position of compensator piston as seen through this glass indicates fluid level. Glass may be installed at any position around longitudinal axis of cylinder to make possible easy viewing. If fluid is required, it may be added—using a standard lube pump—through an Alemite high-pressure fitting in the bottom of the fluid side of the compensator.

Wear plates around coupler shank should be inspected for wear. Replacement of seals within the hydraulic assembly can be accomplished by the removing unit from the car and disassembling one end after draining.

For additional maintenance information, contact A. O. Smith Corp., Rail and Advance Products Div., Milwaukee, Wis.

Hydra-Cushion

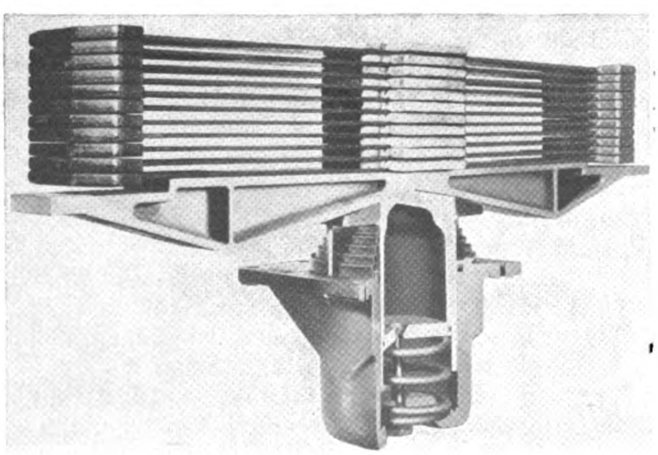
Hydra-Cushion Inc.

Hydra-Cushion consists of the cylinder, piston, friction box, inclined planes, and the movable-and-stationary friction-plate assembly. The cylinder is bolted to the friction box which, in turn, is attached to the carbody. Top of piston has two inclined surfaces bearing against inclined planes mounted beneath the brake, an assembly of bronze stationary plates and movable steel members. The friction box extends upward inside the sliding sill, engaging edges of stationary plates so as to permit upward motion without lateral movement. Interleaved with the stationary plates are movable friction members engaged by lugs on the sliding sill so that they move with it. When the sill slides, an inclined plane forces the piston down, displacing fluid in the bottom of the cylinder through an orifice and past a vertical metering pin which regulates fluid flow. Pressure developed squeezes friction members, generating resistance to sill movement. Return springs center the sliding sill after impact; spring in the cylinder forces the piston back to its starting position as the inclined planes above it are centered.

MAINTENANCE. No periodic maintenance is presently suggested. Indications of malfunction would be evidence of hard contact at the oversolid stops, which are plates attached to the bottom of the sliding sill on both sides of each bolster, and failure of sliding sill to return to the center position.

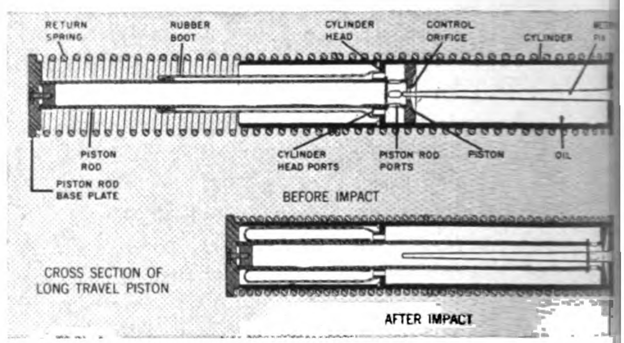
Level of hydraulic fluid need not be checked unless evidences of oil are detected around the unit. Wear of friction plates is slight, indicating that no attention need be given for at least six years after car goes in service. If wear does take place so as to reduce the height of the friction stack by $^3/_8$ in., a shim is to be inserted at the top of the friction box. Inspections should show if there is any damage to the piston's protective boot which could lead to seal damage.

Information on maintenance and trouble-shooting may be obtained from Hydra-Cushion, Inc., 332 S. Michigan ave., Chicago 4, or 13101 Eckles Road, Plymouth, Mich.



Hydroframe

Pullman-Standard Division



Hydroframe-60 or Hydroframe-40—with suffix num indicating the total inches of sliding-sill travel in both rections which are incorporated in the design—has principal components the sliding sill and the hydra cushion cylinder, a self-contained unit which includes return springs. As impacts cause the sliding sill to mo through the stationary sill, the piston and cylinder mo relative to each other, depending on the direction of i pact. Hydraulic fluid then flows past the tapered me ing pin and through the piston's control orifice to the p ton-rod ports. Fluid fills the low-pressure side of the cyli der and the rubber boot which is made to act as a reser by turning back on itself and inflating as it fills with fl attaining a pressure of 3 to 4 psi at the end of the stro The rubber boot also serves as a hermetic seal for the u to combat the leakage often associated with hydraulic d vices. The tapered metering pin, progressively restrict flow as the stroke continues, builds up a hydraulic press which is a function of the speed of the sill movement. T results in an approximately constant cushion for throughout the stroke for optimum efficiency. Full-si travel is achieved in almost every impact, but the restrai ing pressure automatically varies with the velocity.

PERIODIC MAINTENANCE. Recommended are inspe tions to determine if sliding sill is centering properly b measuring from car's end sill to striker of sliding sill a both ends (variation should be 2 in. or less), and b checking for any evidence of oil leakage.

Wear plates which support the sliding sill in the station ary sill should be inspected for excessive wear, with re placement made before parent metal is reached. Cen plates should be checked to detect fractures or loosene

When leakage or malfunction of cushion unit is foun it is to be removed and returned to the manufactur The 9,000-lb precompression in the cushion-return spri built into the unit means recommendations for remo and handling the cushion unit should be followed caref if this is ever necessary.

A maintenance bulletin, "Instruction Manual for Pullman-Standard Hydroframe-60 Cushion Underfra is available from Pullman-Standard, division of Pullm Inc., 200 S. Michigan ave., Chicago 4, Ill.

hock Control

ystone Railway Equipment Co.

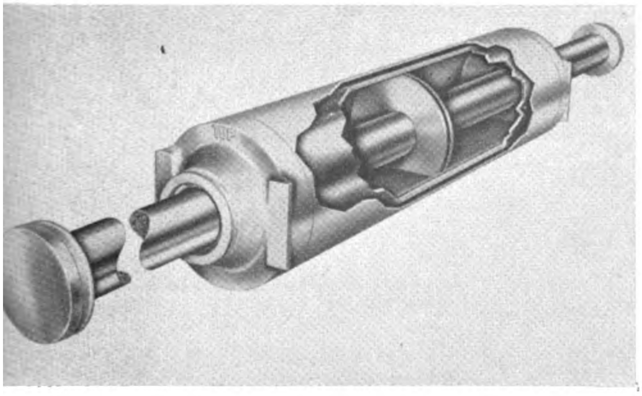
: Shock Control system includes (1) the energy ab-ɔing device—a high-presure, double-acting hydraulic nder surrounded by a low-pressure oil reservoir; (2) ll-return spring located inboard of one bolster; (3) a ting center sill which incorporates 10 to 20 in. of travel houses both cylinder and spring. Movement of the ible-acting piston in either direction forces high-pres- oil from in front of the piston through orifices in the nder wall into the reservoir and then back into the nder behind the receding piston. The hydraulic unit y be rigidly mounted in the center sill and does not have lide in one direction.

ERIODIC MAINTENANCE. At 3- to 4-year intervals the in the system should be checked by removing the ac-s cap in the center of the car floor to expose and permit ıoval of the fill-and-vent plugs in the shell of the low-ssure reservoir. With plugs removed, cylinder wall h its orifices will be exposed. Oil should be visible in orifices about ¼ in. below the top edge of the high-ssure cylinder's exterior. If oil level is low, system uld be filled to the specified level with SAE 10 W-30 tor oil.

Rod seals at the ends of the reservoir will eventually uire replacement. Keystone has a four-tool kit for this eration. It consists of snap-ring pliers, an outer ring de, an inner ring guide, and a retainer-and-packing-nover tool. The complete hydraulic unit is removed m the car and drained for the replacement of the seals the piston rod.

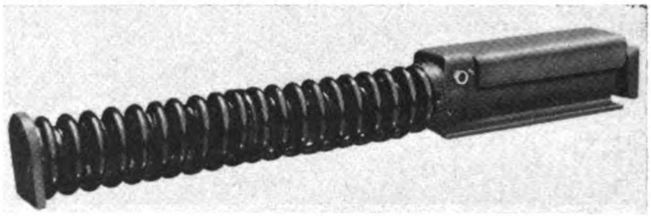
These two procedures are the only maintenance to be rformed on the hydraulic device. The Shock Control inder is sealed at the factory and, under no circum-nces, is to be opened. Should the cylinder itself require y attention or service, the hydraulic device should be urned as a unit to the manufacturer. If it is necessary replace the sill-return spring, this can be done without noving the hydraulic unit from the car.

A maintenance bulletin, "Instructions for the Main-nance of Keystone Shock Control," is available from ystone Railway Equipment Co., 310 S. Michigan ave., icago 4, Ill.



3C Gliding Sill

National Castings Co.



The 3C Gliding Sill has a hydraulic cushioning unit which incorporates an integral return spring group. The system can provide up to 24 in. travel. The housing, which also serves as the low-pressure reservoir, has within it the high-pressure cylinder and the hollow metering pin in which are orifices to control the closing rate and establish the cushioning characteristics. The outer cylinder assembly, which extends outward from housing inside return springs and functions as a guide for the piston assembly, also forms part of the return damping chamber. Upon impact, the piston assembly moves into the high-pressure cylinder where several events occur simultaneously. A flapper valve on the front of the piston closes to cause pressure build-up of the oil trapped in the cylinder. Oil is also forced through the orifices in the hollow metering pin and out of its fixed end into the housing, compressing air in the top of this chamber to about 20 psi. Oil passes through a flapper valve in the back of the piston and into the return damping chamber, relieving pressure on the other flapper valve so it will stay closed. The floating end of metering pin enters the hollow portion of piston shaft where increasing oil pressure closes a ball valve to prevent pressure from damaging the seal assembly. During return stroke, an orifice in back of piston regulates release of oil from return dampening chamber to control expansion of hydraulic unit to neutral position.

PERIODIC MAINTENANCE. Until more service experience has been accumulated, it is recommended that at six-month intervals all installations be inspected. Hydraulic unit should be checked for leakage in a sight glass which is visible through an opening in the side of the center sill near center of the car. As long as any oil is visible, unit will function properly. System contains about 5½ gal of oil. No established oil-change period has yet been set. Filler plug is adjacent to sight glass.

The sliding sill and supports should be checked for excessive wear. If there are indications of malfunction, sliding sill should be immobilized by moving two hydraulic draft stops from their normal inboard positions to the outboard (emergency locking) positions.

Information on handling of defective cars may be obtained from Commercial Engineering Section, Technical Center, National Castings Co., 10600 Quincy ave., Cleveland 6, Ohio. Technical Center Bulletins 317 and 320 discuss maintenance and operation, respectively, of 3C Gliding Sills.

eaning Oil Coolers

(Continued from page 70)

s hell flange, using compressed air acilitate its movement.

he length of time for circulation of solutions can be varied to suit con- ons. Some railroads might find it essary to circulate solutions for a ger period or to reverse the flow re often, or both. Visual inspection tubes through the open pipe con- tions can be useful in evaluating the ıning job to be done. Until clean- intervals are established, it might be valuable to sample the clean- solution during the cycle.

election of the cleaner for this job very important. Such a cleaner ıuld have a flash point at least 50 above the highest anticipated am- nt temperature to avoid accidental ition. It should exhibit low vapor ssure at ambient and present as a toxic hazard as possible. The aner should be one of high sol- ıt and dispersive ability for oil ins, sludge and other carbonaceous ıtamination normally found in oil ›lers. It must also be soluble ough in relatively cheap solvents of non-aqueous type to facilitate its removal. It should not require water or steam for removal from the surfaces being cleaned. Its viscosity should be about like that of diesel fuel in its final mixture. The cleaner should be non-corrosive to the metals it contacts and should not have an offensive odor.

While cleaners for doing this job well are relatively expensive, they can, under proper control, be used over and over so that the cost of cleaning an individual cooler can be quite reasonable. The cleaner certainly should be discarded when it becomes so dirty as to interfere with its desired function, or when there is a chance of depositing material from the cleaning solution on the cooler. Such contamination may be controlled by periodically having the laboratory centrifuge a sample. One procedure for this is to place 50 ml of dirty cleaner and 50 ml of ASTM precipation naptha in a 100 ml centrifuge tube, running this for 30 min, or until all material has been shaken down, as is done in determining precipation number. Cleaning solution is changed when the volume of sludge by this method is 2%.

C. V. Kalkbrenner, mechanical foreman, and T. A. Tennyson, engineer of tests, St. Louis Southwestern.

ersonal Mention

›.—*Springfield, Mo.:* G. J. COSATT, ager planning and scheduling, named tant superintendent motive power. R. OULTER appointed assistant superintend- car department. E. T. MCKENNA ap- ted assistant to chief mechanical officer. J. TRAU, mechanical engineer, named ager of engineering. E. S. WOOD named ict master mechanic, Central district. *a, Okla.:* H. F. RICHARDSON named dis- master mechanic, Southwestern district. *nphis, Tenn.:* J. H. HALL named district ter mechanic, Southeastern district.

Worth & Denver.—*Denver, Colo.:* J. D. ROEDER appointed assistant chief me- nical officer.

ıtour.—*Pittsburgh, Pa.:* Headquarters of F. KASCAL, chief mechanical officer, ved from McKees Rocks, Pa., to Pitts- gh, Pa.

Haven.—*New Haven, Conn.:* ROBERT HOOPER, assistant mechanical superin- dent—locomotive maintenance, retired. ORGE A. CLARKE, assistant mechanical erintendent—engineering, appointed as- ant general mechanical superintendent. NIEL P. PRENDERGAST, master mechanic, ned superintendent of locomotive main- ance. JOSEPH M. QUINN, assistant me- nical superintendent car maintenance, ointed superintendent of car maintenance. JOSEPH J. PFISTER, assistant superintendent in charge of maintenance of equipment shop, appointed master mechanic. EDWIN J. COOK, superintendent car shops, named assistant superintendent of maintenance of equipment shops.

Nickel Plate.—*Fort Wayne, Ind.* (Fort Wayne-Chicago Divisions): C. N. HENDERSON appointed general car foreman. *Cleveland* (Cleveland Division): V. P. MEANEY appointed assistant road foreman of engines. *Pine Valley, Ohio* (Wheeling & Lake Erie District): S. T. BATTILOCHI appointed roundhouse foreman. *Bellevue, Ohio:* R. L. DICK appointed electrical foreman.

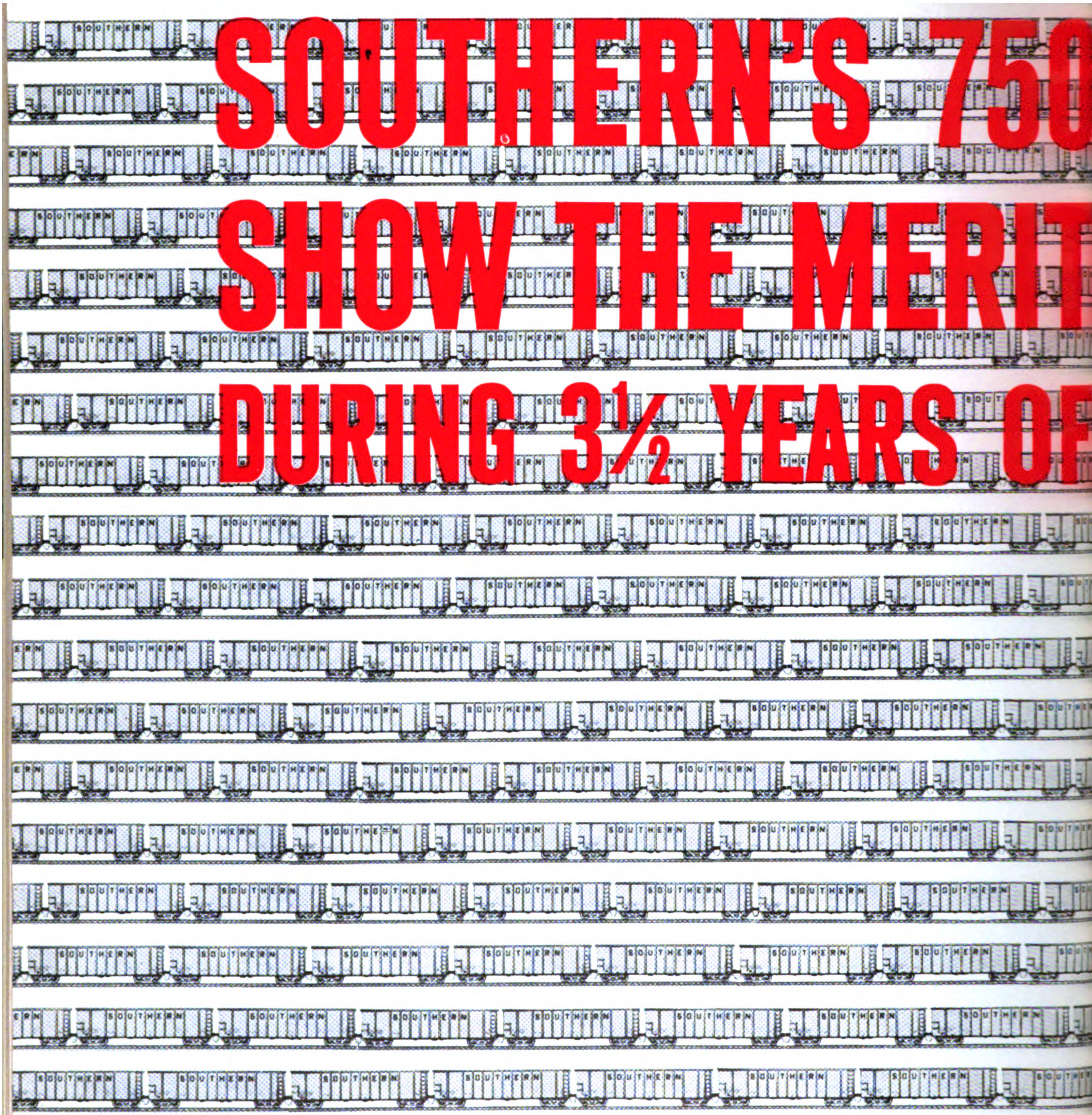
Pittsburgh & Shawmut.—*Brookville, Pa.:* Headquarters of W. R. WEAVER, chief engineer and chief mechanical officer, moved from Kittanning, Pa., to Brookville.

Southern Pacific.—*Ogden, Utah:* W. F. SCOBEL appointed master mechanic, Salt Lake Division. *Los Angeles:* W. J. KRAMER appointed assistant master mechanic, Taylor Yard, Los Angeles Division. *Eugene, Ore.:* E. A. HOWDEN appointed assistant master mechanic, Portland Division. *San Francisco, Calif.:* R. J. MCALLISTER appointed traveling diesel supervisor; A. E. KALLMAN, traveling AAR supervisor and inspector.

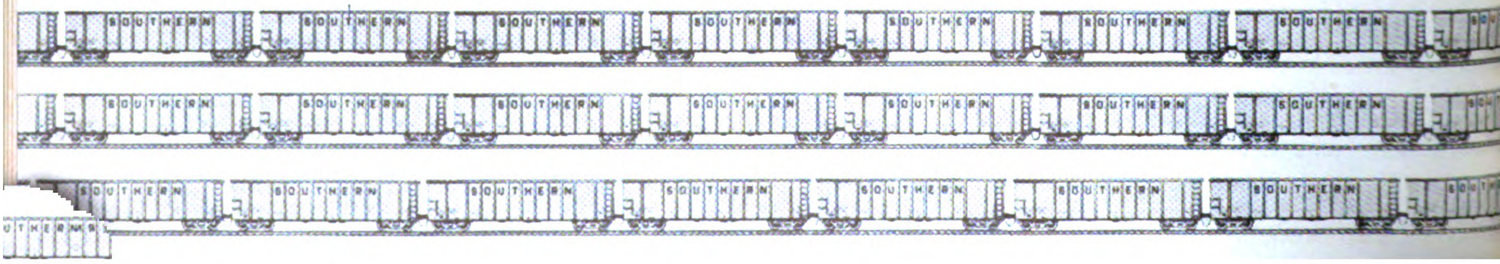
OBITUARY

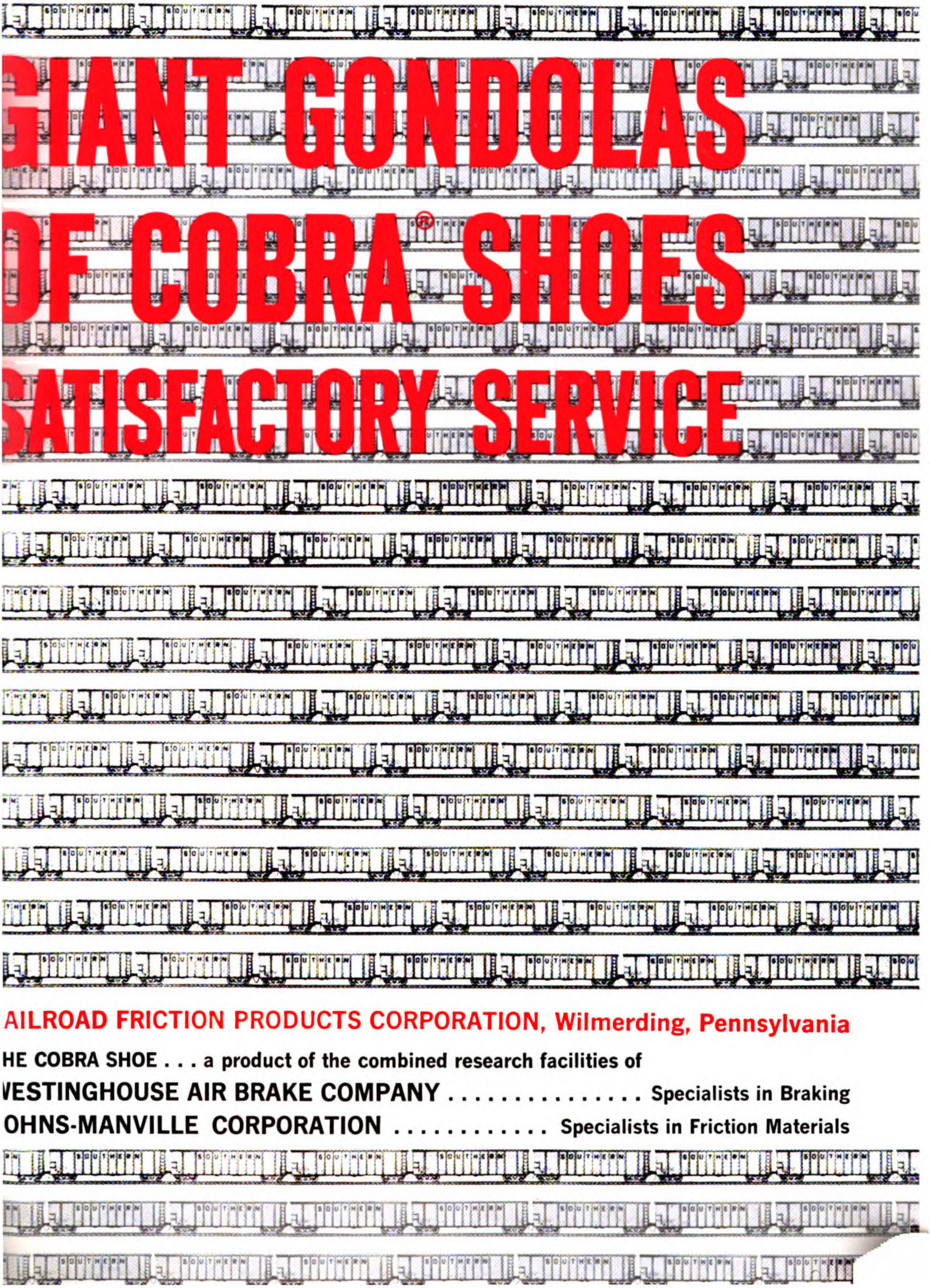
Curtis Lee Dickert, who retired in 1949 as superintendent of motive power, Central of Georgia, died Aug. 31 in Bessemer, Ala. Mr. Dickert was a past president (1931) of the Southern & Southwestern Railway Club.

SOUTHERN'S 750 SHOW THE MERIT DURING 3½ YEARS OF



Substantial savings were realized in the initial cost of these cars when Cobra Shoes were specified. The uniform high frictional characteristics of these modern brake shoes permitted the use of a lighter and less complicated brake arrangement. Reduced maintenance plus added wheel and shoe life are also contributing important operating economies.




GIANT GONDOLAS
OF COBRA® SHOES
SATISFACTORY SERVICE
AILROAD FRICTION PRODUCTS CORPORATION, Wilmerding, Pennsylvania
HE COBRA SHOE . . . a product of the combined research facilities of
VESTINGHOUSE AIR BRAKE COMPANY . . . . Specialists in Braking
OHNS-MANVILLE CORPORATION . . . . Specialists in Friction Materials

What's New

(Continued from page 33)

positive self-locking feature prevents damage to car interior or Load Divider if gates are left unsecured after unloading. Preco Incorporated.

For more information, circlt 10-36 on card following page 100.

Liquid Detergent

"Unlocks" is a general-purpose detergent for cleaning exteriors and interiors of diesel locomotives and cars, both passenger and freight. It is a mild, blue viscous liquid which is said to be safe on paint, fabric, plastic, rubber and all metals. It is non-flammable and odorless, and can be used safely inside enclosed work areas. Dilution ratios range from 1:10 to 1:50. Wyandotte Chemicals Corp.

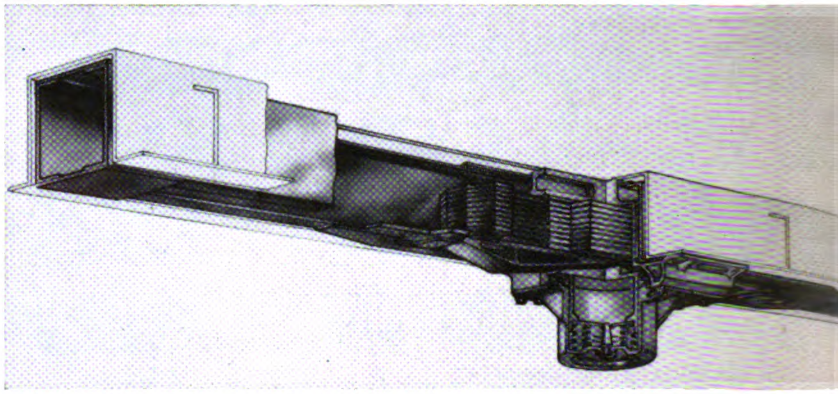
For more information, circle 10-37 on card following page 100.

Cleaners and Heaters

A steam cleaner designed for cleaning motors and other heavy equipment delivers 90 gal of high-pressure steam per hour. It automatically mixes steam and soap for grease cutting and cleaning action. It is fired by fuel oil or kerosene and has automatic ignition for regular current supply.

Kerosene or regular home heating oil fires the Western portable warm-air heater which can also be used for drying and thawing purposes where 110-volt current is available. The unit has a capacity of 105,000 Btu output; a blower capable of projecting a jet stream of warm air to 1 and a capacity of up to 15 hr of contin operation. Western Railroad Supply C

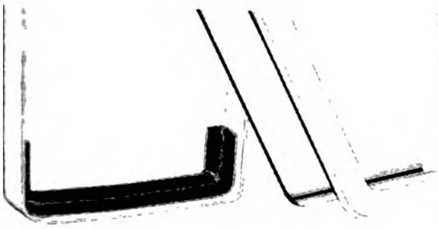
For more information, circle 10-3 card following page 100.



Hydraulic Cushioning

Hydra-Cushion, a schock-absorbing sliding sill device, can now be applied to existing freight cars rather than only being built into new cars, as has previously been the case. The redesigned cushioning installation can go on any car with a standard AAR center sill. The Hydra-Cushion underframe is designed so that coupler forces are imparted to the sliding sill which moves under impact. A retarding device, consisting of a combination of a low-pressure hydraulic unit and two groups of friction pla gradually reduces the movement. Un impact from either end, the moving sill tuates the hydraulic unit which, in t builds up pressure against the friction pl to retard sill movement and dissipate pact. Hydraulic fluid is contained at pressure in an upright cylinder. The sys incorporates 20 inches of sill travel. Hy Cushion, Inc.

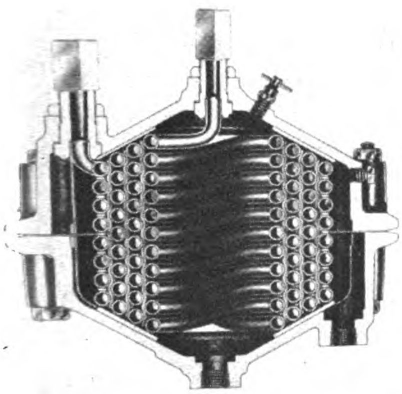
For more information, circle 10-39 card following page 100.



ıbber Gasket

sponge-rubber hopper-door gasket, de-
ned to prevent cargo leakage, is said to
hstand all elements and retain its soft
›nge characteristics at 60 deg below zero.
is bonded to hopper-car-pocket doors
h Super Seal liquid rubber adhesive, ap-
ed as paint. Railroad Rubber Products,
:.

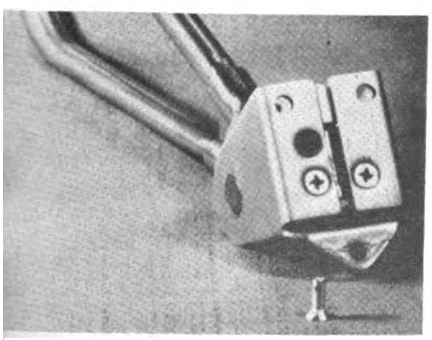
For more information, circle 10-40 on
rd following page 100.



leat Exchanger Coil

y increasing the space between coil tubing,
e water flow through steam generator coils
ı 4516 and 4616 boilers has been im-
·oved to reduce lime deposit and improve
:at transfer. A replacement kit to fit the
-4050 heat exchanger body includes a
rger coil configuration with new short
›pper tube connection for increased vi-
:ation resistance and easier handling, and
gasket and copper retaining ring. Vapor
orp.

For more information, circle 10-41 on
ırd following page 100.



›elf-Locking Screws

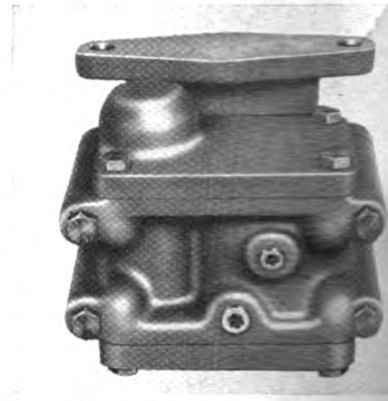
'o overcome the vibration and shock hand
olds receive in rapid transit cars, Ellcon-
ṅational uses ¼-in.-20 x ¾-in. Phillips
2-deg flat head Nylok self-locking machine

screws which are said to hold components fast under extreme operating conditions. When installed, the screw's nylon pellet is compressed, setting up a counterforce and a metal-to-metal engagement of the threads opposite the pellet. The nylon is said to "grow" into the threads, providing a permanent locking action. Nylok Corp.

For more information, circle 10-42 on card following page 100.

Safety Control

The Wabco safety control system for locomotives includes small valves and devices interlocking with the air-brake system through the medium of a foot pedal and connected whistle. When brakes are applied normally, pedal pressure may be released, but when running over the road the foot pedal must be depressed to avert brake application. The system can be adjusted to require continuous foot pedal pressure, or to permit occasional relaxing of pressure for several seconds during which a whistle warns the engineman. Failure to restore foot pressure within this interval will result either in a full service brake application, or a faster, more intense emergency application. Provision can be made for simultaneous power cut off and prevention of release of brakes (charging cut-off) until a full stop is accomplished. The A-1 cycling valve, illustrated, can be incorporated in the



system to safeguard against the collapse the engineman on the foot pedal or o interference with his normal supervisi It can be operated from multiple stati on the locomotive. Westinghouse Air Br Co.

For more information, circle 10-43 card following page 100.

Dry Air Package

Air produced by the Arid-Pac is said to virtually free of moisture, dirt and vapors which can block and corrode instr ment control systems and other process The dryer works at a maximum pressure 100 psig at capacities of 0.685, 1.3, 2. 4.6, 6.7 and 10.3 cfm. Compressed air delivered to the system with an atmosphe dew point of −12 deg F. The dryer has regeneration cycle, no periodic changing chemicals, and no chemical carryover the system to endanger controls or proc fluids. Ingersoll-Rand Co.

For more information, circle 10-44 card following page 100.

Composition Shoes

The high- and low-friction Anchor comp sition shoes, developed jointly by Griff and Raybestos-Manhattan, Inc., are said last from 2.5 to 4 times longer than cas iron shoes under identical braking cond tions. Tests showed that the shoes el nated wheel grooving and that braki forces with the high-friction shoes we about ½ to ⅕ those needed with the cas iron shoes. The low-friction shoes can b interchanged with cast-iron brake shoe High-friction shoes cannot be interchang with conventional metallic shoes, but ca

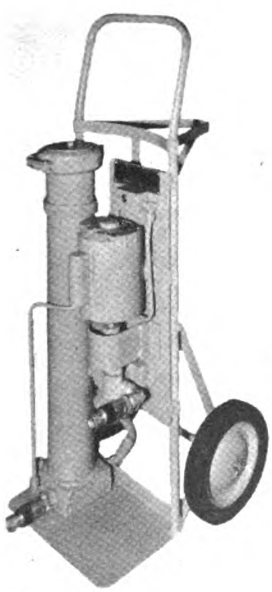
used with the compact package brake ts now available for freight cars. Griffin eel Co.

'or more information, circle 10-45 on ł following page 100.

›ck Support Casting

ıt-steel deck supports for the upper decks automobile piggyback cars are said to duce a unit with greater strength and ger life under the heavier loads to which se structures are now being subjected. ›y are said to be economical for the ger rack cars now being built or rebuilt. ›ports are designed for bolting to the ver-ıl members, making changes in deck arances possible. Scullin Steel Co.

For more information, circle 10-46 on 'd following page 100.



ilter Buggy

ıe Schroeder filter buggy is a mobile unit ıich can be connected to the circulating stem of any type of hydraulic equipment machinery for the purpose of filtering ntaminates from the fluid. It uses a 1/3-hp, ıgle or three-phase a-c motor, and a gpm hydraulic pump. Filtering elements 5, 10, or 25 micron rating are furnished ith the buggy unit. Schroeder Brothers orp.

For more information, circle 10-47 on ırd following page 100.

Report *(Continued from page*

Wheels and Axles Will Be ASME Meeting Topic

"Wheel, Axle and Rail-Stress Problems lated to Higher-Capacity Cars" will be subject for panel discussion at the Rail Division session during the 1963 Wi Annual Meeting of the American Society Mechanical Engineers. The annual mee of the Society is to be held November 17 a week prior to Thanksgiving, in Phila phia, Pa. Its theme is "Engineering Secure the Blessings of Liberty." He quarters and technical sessions will be in Bellevue-Stratford Hotel.

C. E. Tack, vice president-engineer American Steel Foundries, Inc., is chairm of the Railroad Division.

Million Miles Exceeded For Fourth Month

June's average 1,073,140 miles per hot setoff between terminals is 1963's fou month in which million-mile performa was exceeded. AAR Mechanical Divis compiles member-road figures.

	Cars set off between terminals with hot boxes		Mil per set o
June 1959	20,169		138,0
	Pads	Waste	
June 1960	1,795	14,934	159,3
June 1961	2,193	6,608	293,3
June 1962	2,082	684	938,5
1963			
January	2,351	178	954,2
February	2,391	125	939,0
March	2,374	143	1,074,7
April	2,208	118	1,135,9
May	2,342	125	1,144,1
June	2,423	82	1,073,1

Orders and Inquiries for New Equipment

Placed Since Closing of Sept. Issue

Passenger-Car Orders

MONTREAL METRO.—*Canadian Vickers, Ltd.* rubber-tired subway cars. Cost, $45,513,918 Con tract calls for design, manufacture and delivery the cars, components for the spare parts dep and five tractors for work trains. Original plans were for the purchase of 252 rubber-ti cars at a cost of $20.9 million. The 21-m Montreal subway system is expected to be operation by 1966.

NEW YORK CITY TRANSIT AUTHORITY.—*Bu* 600 stainless-steel transit cars. Cost, $68.8 milli

UNION PACIFIC.—*St. Louis Car:* 15 85-ft. conditioned, lightweight chair cars; 100 postal storage cars. Chair cars to have alumin superstructures and four-wheel outside sw hanger trucks and one-piece GSI platform body bolster castings. Steel postal cars will both for head-end and freight service and have GSI one-piece cast-steel underframe arranged for a cushioning device. Deliveries begin in about six months and completed with 17 months.

Locomotive Orders

WESTERN MARYLAND.—*EMD:* 5 2,500-hp, GP diesel-electric locomotives.

Freight-Car Orders

ATLANTIC REFINING CO.—*Union Tank Car* 33,500-gal-capacity tank cars and 3 38,500-g capacity cars for hauling liquified petroleum on lease. Delivery started in September.

ESAPEAKE & OHIO.—*ACF:* 45 100-ton Center covered hopper cars of 4,000 cu ft capacity.

ICAGO FREIGHT CAR.—*ACF:* 25 100-ton cov- ıopper cars. Delivered.

IMONWEALTH EDISON.—*Thrall:* 378 100-ton ılas with swivel couplers. Cost, approxi- y $5 million. To be used as three integral coal trains for moving 5½ million tons of ınnually from southern Indiana and Illinois elds via GM&O and NYC to the utility's Chi- ırea generating stations. Deliveries to begin ı4.

ıND TRUNK WESTERN.—*Thrall:* 59 60¾-ft, ı steel-sheathed box cars. Estimated cost,),000,000. For December delivery. Cars, to ed for hauling automobile engines, will be ped with cushion underframes and with in- protective devices, the latter costing ap- nately $270,000. An earlier order for 131 heathed box cars from Pullman-Standard elivered in September.

NOIS CENTRAL.—*Company shops:* 700 70-ton r cars and 25 60-ft, 70-ton flat cars with teel underframes; 100 50-ton log cars. Log scheduled for completion this month; flat in December; hoppers, in early 1964.

SEY CENTRAL LINES.—*U.S. Railway Equip-* 341 hopper cars. On lease.

IGH VALLEY.—*Pullman-Standard:* 20 100- vered hopper cars; 10 70-ton covered hopper four 50-ft, cushion-underframe insulated ars. Covered hoppers to replace box cars vement of grain and corn from Buffalo to n New York.

ISVILLE & NASHVILLE. — *Pullman-Standard:* 00-ton, 2,929-cu-ft-capacity covered hopper For November delivery.

TH AMERICAN CAR.—*ACF:* 100 100-ton, cu-ft capacity Center Flow covered hopper Cost, $1,430,000. For December delivery.

TA FE.—*Pacific Car & Fdry.:* 25 60-ft, 100- sulated, double-plug, roller-bearing box cars. ry to begin in December. *Pullman-Stand-* ,000 trough-hatch covered hopper cars of cu ft capacity for handling grain and pot- Cost, $15 million. Delivery to start in No- r and completed by February 1964.

EDO, PEORIA & WESTERN. — *U.S. Railway ment:* 100 70-ton high-cube open hoppers. ourth quarter delivery.

ILER TRAIN.—*ACF:* 200 89-ft flat cars equip- ith FreightMaster cushioning devices. For nber delivery.

ON PACIFIC.—*Gunderson Brothers Engineer- orp.:* 300 40-ft, 40-ton-capacity livestock cars oller bearings and slatted steel sides. Sixty- rs to be delivered in December; remainder, first quarter of 1964.

STERN MARYLAND. — *Bethlehem Steel:* 150 n, roller-bearing hopper cars. *Pullman- ırd:* 50 70-ton, 50-ft, cushioned, double-door, bearing box cars.

ITEHEAD & KALES.—*Company shops:* 100 el 40-ft caboose cars with eight swivel seats vo-walk-over bay seats. The cars, the first r type to be built by W&K, will be equipped lternator electric power, radio communica- 162-gal inside water storage, and 113-gal- k with pump feed. Interiors are being in- l with 3-in. fiber glass, and panelling is be- ulked with cork for anti-squeak, and sharp s padded. The Southern Pacific is reported urchaser of these cars.

s and Inquiries

co will order 100 50-ft insulated box cars roller bearings and cushion underframes; 500-cu-ft covered hoppers with roller bear- 100 3,000-cu-ft steel covered hoppers; 100 ı roller-bearing open hoppers; 50 70-ton ad flat cars; five 85-ft, low density, high- ars with cushion underframes and roller gs; and 100 50-ft box cars with cushion rames and roller bearings. Total cost of m, which also calls for purchase of 16 new tives, will be $11,275,000.

New York Port Authority Trans-Hudson (PATH) is asking for modifications of ıl designs for 150-260 air-conditioned cars ted by four carbuilders last April. The ations involve new design features—ar- nents of seats, doors and related circu- areas—developed by PATH and its tech- consultants "to provide greater operating ity and economy in train service, as well proved passenger comfort. The four com- vying for the order, possibly $25 million, dd, Pullman-Standard, St. Louis Car, and i, Ltd.

Facilities

tern Maryland is constructing two new ar repair shops, one at Hagerstown, Md., e other at Ridgeley, W.Va.

Supply Trade

AMERICAN STEEL FOUNDRIES
—*James M. Lloyd*, district sales manag
charge of Pittsburgh office, Transporta
Equipment Div., retired. Pittsburgh
office now consolidated with Cleveland
fice, in charge of *E. C. Blakeman*, di
sales manager at Cleveland. Headqua
of *R. G. Brossard*, representative, H
mond Division, moved from 630 Fift
to Room 1221, 230 Park ave., New Yor

BOWER ROLLER BEARING DIV.
ERAL-MOGUL-BOWER BEARINGS, Inc
Standard Railway Equipment Divisi
Stanray Corp. named exclusive national
road sales representative for Bower Red
bearings.

UNION CARBIDE CORP.—Name
most major divisions of Union Carbide
been shortened, to wit: *National Ca*
Co. now Carbon Products Division
Linde Co. now Linde Division.

NATIONAL CASTINGS CO.—*G. L.*
ger named works manager, Sharon
Works, succeeding *Robert D. Everet*
signed.

BRANDON EQUIPMENT CO.—
Cargo Supply, Inc., San Francisco,
pointed representative to western rail
and industrial customers.

ARMCO STEEL CORP.—*E. T. Cross*
president and manager, construction
railroad sales, Metal Products Div., re
C. W. Bean, assistant manager, named
ager of railroad sales. *W. B. Roof*,
construction engineer, railroad sales
construction, named manager of cons
tion services.

VAPOR CORP.—*W. J. Burrows* app
sales manager. Formerly manager of
and maintenance at Montreal.

BUDD CO.—*Kenneth W. Rowe* app
staff assistant to *William L. Sheppard*
president and general manager, Railway
vision. Mr. Rowe will be assigned pri
to New York City Transit Authority
gram. Headquarters of Mr. Rowe, wh
formerly with ACF Industries, will
Red Lion and Verree Roads, Ph
phia 15.

WESTINGHOUSE ELECTRIC COR
Donald C. Burnham elected preside
chief executive, succeeding *Mark W. C*
Jr., who resigned for reasons of healt
Burnham formerly vice president in
of company's industrial group.

UNION RAILWAY EQUIPMENT C
Marvin W. Wolfe, Wolfe Equipment
St. Louis, named sales representative
Louis-Kansas City-Texas territory.

ALCO PRODUCTS, INC.—*Char*
Davis, a vice president, appointed to
Alco forge and spring divisions, with
over research and development, en
ing, manufacturing and sales. Headq

r. Davis remain at 530 Fifth ave., New
.

LMAN-STANDARD, DIVISION OF MAN INC.: *Norman E. Bateson* ap- ed director of engineering in charge of it- and passenger-car engineering and rch and development activities. *R. M. :r* continues as general manager, it-car engineering, at Michigan City, and *William Van Der Sluys* as general ger, passenger-car engineering at Pull- car works plant in Chicago.

RIER AIR CONDITIONING CO.— portation department reorganized as parate, specialized unit to meet ex- :d activities in field of refrigeration air conditioning for transportation use. *R. Voigt* appointed general manager.

ES SERVICE OIL CO.—Headquarters ilway Sales Department moved from York to 20 N. Wacker Drive, Chicago. . *Mosher* is manager of railway sales.

CTRO - MOTIVE DIV., GENERAL ORS.—With delivery of new GP-35 be- ng this month, EMD's locomotive war- is being increased to two years, or 00 miles.

ITREAL LOCOMOTIVE WORKS, —*I. I. Sylvester* appointed West Coast sentative, with headquarters in Van- :r, B.C.

rade Publications

obtain copies of publications, circle sponding numbers on card following 100.

ROLLER BEARINGS. "The First Mil- tells how Timken started the switch to er Freight" and what it holds for the e of railroading. Timken Co.

HOP EQUIPMENT. Shop Equipment og No. 3000 describes bench equip- service carts, tool stands, tool toters drawer units for use in shops, factories, tenance and repair facilities. Penco ucts Inc.

MACHINE TOOL ACCESSORIES. :, drill press, and swivel machine vises; holders and positioners, milling tables, g tables, angle plates and lathe attach- s described in "Palmgren Steel Prod- catalog. Palmgren Steel Products.

POLYESTER-CLAD PLYWOOD. Bul- introducing Micarta polyester-clad ply- for freight-car and container linings how material is made and fabricated discusses its impact resistance and its ance to 47 chemicals. Westinghouse ric Corp.

OHIO BRASS STORY. "75 Years of ing for Tomorrow" tells the story of rst 75 years of Ohio Brass and its pres- nd projected activities in transit, power bution, and related fields. Ohio Brass

Advertisers Index

cp

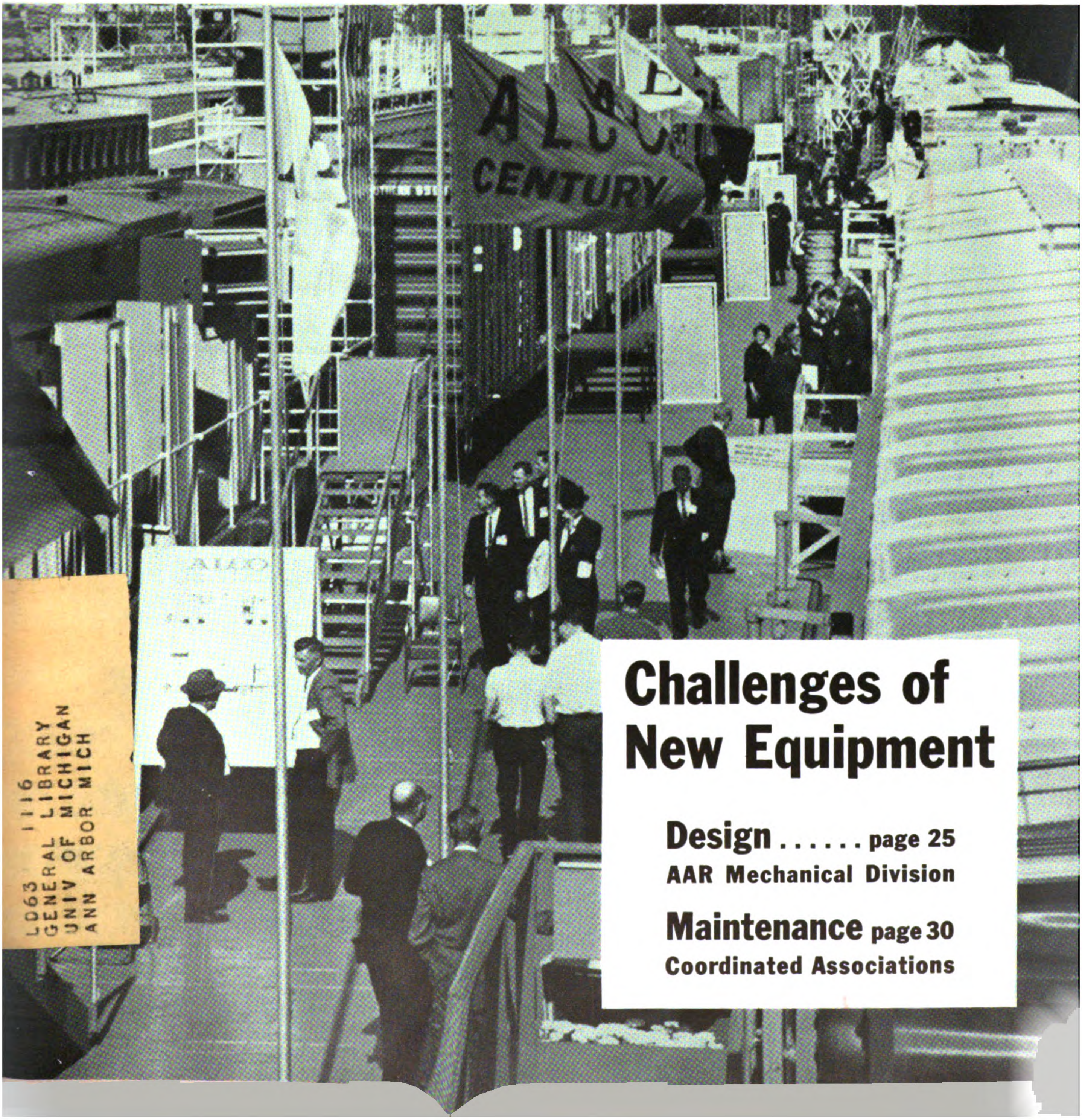
ILWAY
.ocomotives
nd Cars

NOVEMBER 1963

L&N Uses Five Alloy Steels in 100-Ton Hoppers For Its Integral Coal Train

...page 21

A Simmons-Boardman
TIME SAVER Publication



Challenges of New Equipment

AILWAY

_ocomotives ınd Cars

America's Oldest Trade Paper
November, 1963—Vol. 137, No. 11

ıE SAVING IDEAS FOR NOVEMBER

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Report

High-Capacity Cars Topic for ASME Meeting

The program for the Railroad Division sessions to be held during the ASME Winter annual meeting at the Bellevue-Stratford Hotel, Philadelphia, Pa., as mentioned in the October issue, page 96, is as follows:

WEDNESDAY, NOVEMBER 20
2:30 p.m.

Progress in Railway Mechanical Engineering 1962-63—D. R. Meier, manager, Locomotive Product Planning and Marketing Research, Locomotive Section, General Electric Co.

Use of High-Performance Steels in Freight and Passenger Cars—S. C. Lore, assistant manager, and H. P. Clapp, research engineer, U. S. Steel Corp.

Design and Construction of an Adjustable-Side Well Hole Car-Reporting Mark NNSX-1—F. J. Myers, design supervisor, Newport News Shipbuilding & Dry Dock Co.

THURSDAY, NOVEMBER 21
9 a.m.

Panel on Wheel, Axle and Rail-Stress Problems Related to Higher Capacity Cars:

Axle Problems—O. J. Horger, chief engineer, Railway Div., Timken Roller Bearing Co.

Center-Plate Conditions for Freight Cars — G. P. McGavock, mechanical engineer, Norfolk & Western.

Wheel Problems—A. M. Johnsen, supervising research metallurgist, Armco Steel Corp.

Rail Problems — R. B. Stampfle, metallurgical engineer, Bethlehem Steel Co.

12 Noon

Railroad Division Luncheon. Guest speaker — D. C. Bevan, vice president-finance, Pennsylvania.

2:30 p.m.

Cars and Locomotives in Japan—W. M. Keller, vice president-research, AAR.

Environmental Vibration Measurements of Transit Propulsion Equipment — J. A. Nelson, mechanical design engineer, General Electric Co.

The General 70-A New Family of Trucks for Rapid Transit, Commuter and Main Line Equipment—R. L. Lich, assistant vice president, engineering, General Steel Industries.

Equipment Diagrams, Pad Specifications Changed

Journal lubricator specifications have been altered and new cross-section diagrams for large capacity freight cars have been adopted "overwhelmingly" by a special AAR Mechanical Division letter ballot.

Member roads approved a revision of Specification M-918-62, Car Journal Lubricating Devices, to change the "conditional approval" requirement for lubricators from 80 to 65 hotbox set-outs per 54,000 car-months of active service. There was no

(Continued on page 48)

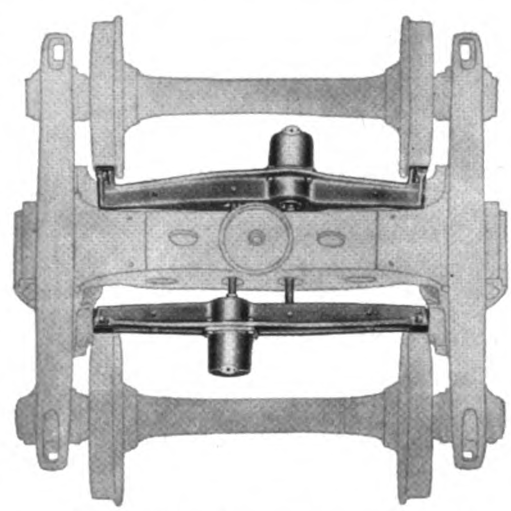
The world's biggest boxcar has the world'

mplest brake assembly...WABCOPAC®

Southern Railroad's new mammoth boxcar is so long that s to have skylights in the roof so that the unloading crew see what they are doing. Equipped with WABCOPAC Brake embly, the car is nicknamed the "Big Boy" and with approx- ely 10,000-cubic-foot capacity and an over-all length of 95 it certainly deserves that name. Southern needed a very e capacity car to permit low-cost handling of tobacco in shead as well as other light, bulky loads. They built the "Big " and equipped it with the WABCOPAC Brake Assembly. 'ABCOPAC Brake Assemblies eliminate body-mounted nders, cylinder levers, slack adjusters, support brackets, s, truck levers and beams. By reducing dead weight, hauling ts are lower and payload can be increased. Each truck embly consists of two identical WABCOPAC Brake Units, ed by push rods and equipped with COBRA* Composition ke Shoes.

ompare these advantages to your present operation, n contact your local Westinghouse Air Brake Division resentative.

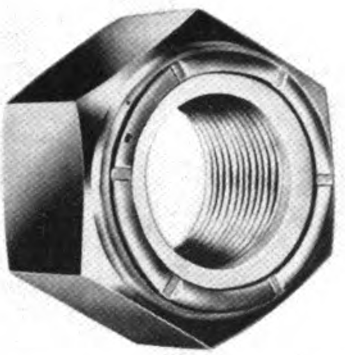
istered trademark of Railroad Friction Products Corporation



WABCO

WESTINGHOUSE AIR BRAKE DIVISION
WILMERDING, PA. / Westinghouse Air Brake Company

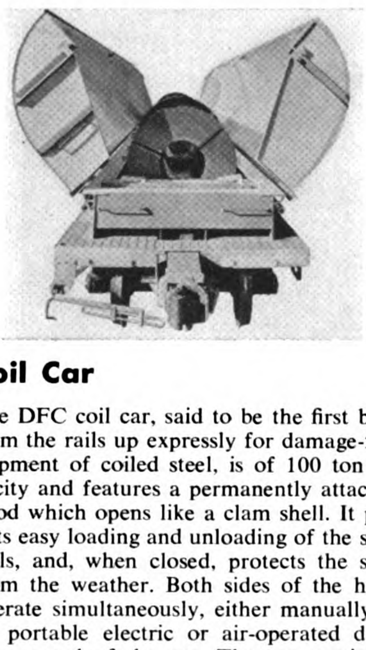
What's New in Equipment



Nylon Insert Lock Nuts

The M-F nylon insert lock nut is available in sizes 4-40 through 2 in.-4½ light hexagon, finished hexagon, machine screw hexagon, and heavy hexagon patterns. Materials include carbon steels, stainless steel, brass and aluminum. The nuts comply with military and aircraft specifications. MacLean-Fogg Lock Nut Co.

For more information, circle 11-1 on card following page 52.



Coil Car

The DFC coil car, said to be the first built from the rails up expressly for damage-free shipment of coiled steel, is of 100 ton capacity and features a permanently attached hood which opens like a clam shell. It permits easy loading and unloading of the steel coils, and, when closed, protects the steel from the weather. Both sides of the hood operate simultaneously, either manually or by portable electric or air-operated drive at one end of the car. The car, equipped with a 20-in. travel Hydra-Cushion underframe, handles coils from 30 to 84 in. in diameter. Because no deck cushioning or sliding cradle is required, Evans reports the car is capable of carrying at least 50% more than any other car now used to ship coiled steel. Interior of the car is fitted with heavy-duty crossmembers that automatically expand to rest snugly against the coiled steel, insuring greater stability in transit. The crossmembers slide on the top flanges of the side-sill beams. The Barber S-2-B trucks are equipped with 36-in. diameter one-wear wrought-steel wheels, 6½ x 12 roller bearings, and Wabcopac truck-mounted cylinders. Evans Products Co.

For more information, circle 11-2 on card following page 52.

Zinc Coating

The abrasion resistance of Zincilate 101-C is said to be greater than required by carbuilders' specifications. The nonflammable and non-toxic coating is said to provide galvanic protection to all ferrous and aluminous metals. It may be applied, without risk of fire or explosion, to interiors of all types of freight cars. It is said to have been proved in ore-car service in Australia during the past 16 years. Industrial Metal Protectives, Inc.

For more information, circle 11-3 on card following page 52.

Portable Power Nailer

The air-operated Powasert Utility Nailer utilizes Stitch-Pak strips of threaded or smooth shank nails. No feeder unit or separator is used, the machine consisting entirely of the hand-held unit connected to its air supply by a flexible hose. The nailer, developed jointly by United and the Independent Nail Corp., Bridgewater, Mass., has a 50-nail "cartridge" and can drive nails up to 8d size into hard oak or other hard woods. Weight of the unit is 14 lb. United Shoe Machinery Corp.

For more information, circle 11-4 on card following page 52.

Metal Protector

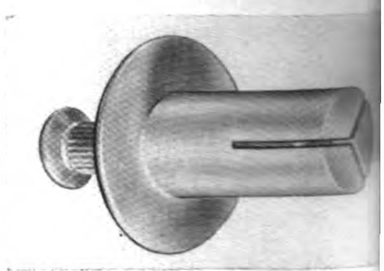
LPS, a four-way metal protector, is said to stop rust and corrosion, displace water and penetrate and lubricate as well. The organic metal preservative deposits a micro-thin, non-greasy, moisture proof molecular film on any metal surface. It may be applied by spray, dip, swab or brush, and is available in 7-, 12-, and 16-oz aerosol cans, and in 1-, 5-, and 55-gal drums. LPS Research Laboratories.

For more information, circle 11-5 on card following page 52.

Water Cooler

The thermoelectric system, in which el-
tricity passes across the junctions of
dissimilar materials to create cold,
tures a water cooler for use on locomo
The cooler, which has no moving p
has been under development, in coo
ation with the Illinois Central, since 19
and 275 units have now been buil
thermoelectric refrigerator is also be
field tested by a western road. West
house Electric Corp.

For more information, circle 11-6 card following page 52.



Drive Rivets

The Cherry Drive Rivet can be driven fr
one side of the work with a hammer, eli
nating special tooling. The stainless-s
pin which is driven down into the shank
form the head on the rivet has only th
prongs instead of the conventional fo
Staking is said to be tighter and m
secure. The rivets are available in diame
of ⅛, 5/32, 3/16 and ¼ in. with a comp
grip range and choice of head styles,
cluding a liner head for fastening plyw
panels in trucks and trailers. Townsend C

For more information, circle 11-7 card following page 52.

Plywood Flooring

Strength and application tests of a new fl
system for box cars, van-type trailers
cargo containers now being conducted
the Douglas Fir laboratories indicate
plywood has two primary advantages

400 New 100-ton Quad Hopper Cars for MoPac

Designed and Built by Bethlehem

Here goes a brand new string of quadruple hopper cars, part of an order of 400 built by Bethlehem for the Missouri Pacific Railroad. Of Bethlehem design, this car has many of the modern features of the so-called "committee" 70-ton car which Bethlehem has built in quantity for several large coal carriers.

The MoPac car measures 49 ft over strikers, has an inside width of 9 ft 9½ in., and stands 11 ft 0 in. from rail head to top of side chord. This car is designed to carry 100 tons of either coal or iron ore. All plates which come into contact with the lading are of Mayari R high-strength low-alloy steel for long resistance to corrosion and abrasion.

Bethlehem is well equipped to work with you on designs for either special or standard cars—hoppers, gondolas, bulkhead flats, piggyback cars. Let's discuss your needs.

Steel

Steel for Strength

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

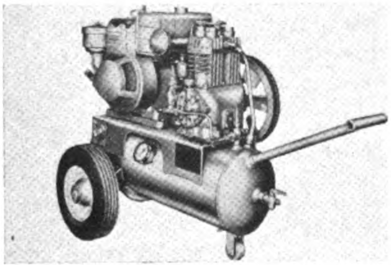
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

conventional car decking. Plywood can be bolted to the sills in large, cut-to-size panels, using only about half the number of bolts required for a lumber deck, with a consequent reduction in labor costs. It was also found that a lift truck, which applies a heavy, concentrated load, will not completely puncture the plywood floor. Failures occurred in test floors made up of two layers of commercially available plywood panels and subjected to concentrated loads of up to 30,000 lb, but the test wheel did not break through. For a 6,000-lb capacity lift truck, the normal maximum load per drive wheel is only about 7,500 lb. A floor of structural plywood panels in a box car in actual use since last April is said to be holding up well. Douglas Fir Plywood Assn.

For more information, circle 11-8 on card following page 52.



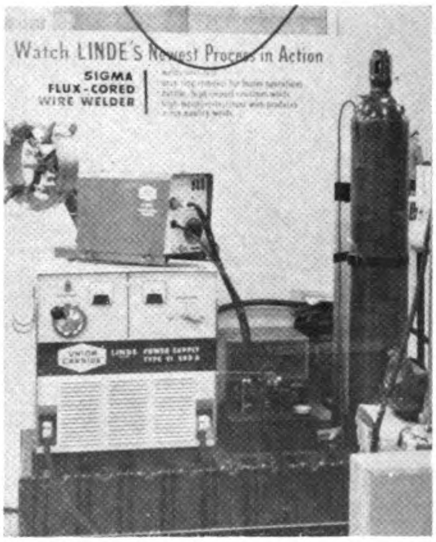
Air Compressors

Lo-Boy portable air compressors for powering air tools, spray equipment, power nailers and staplers are available in three models—one powered by a 1½-hp electric motor and the others by 3- and 5-hp gas engines. At 110-psi, the electric unit provides 6 cfm, the 3-hp unit, 6.7 cfm, and the 5-hp, 7 cfm. All models are wheel-mounted on 12-in. tires and equipped with a 10 gallon air tank, complete with safety valve, tank drain, air pressure gauge and off-on air outlet valve. The electric-powered compressor has a built-in thermal overload device and manual reset button to protect motor. Both gas models have recoil starters. Compressor portions of all three are pressure lubricated. Stellite exhaust valves are used in the 5-hp model. Binks Manufacturing Co.

For more information, circle 11-9 on card following page 52.

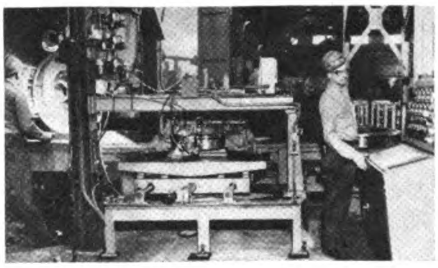
Flux-Cored Wire Welder

The Flux-Cored Wire Welder is a compact unit which eliminates the use of individual electrodes. It is said to be particularly useful for fabrication or rebuilding of railroad rolling stock because of its ability to weld rusty, heavy-gauge steel, even when fit-up has been poor. The unit incorporates the SWM-21 wire feeder which can deliver solid or cored welding wire to the torch, an air-cooled Model ST 11 with a 500-amp continuous duty rating. A major reduction in weld preparation time results from the ability of the unit to weld over rust, simultaneously producing X-ray quality work, when cored wire, available in sizes up to ⅛ in., is used. Flux quality is such that



multipass welding can be performed without expensive, time-consuming cleaning between passes. Union Carbide Corp.

For more information, circle 11-10 on card following page 52.



Car Wheel Gauge

The automatic car-wheel gauge can be adjusted for 25 wheel types ranging from 28 to 44 in. in diameter. It measures ten dimensions to AAR tolerance specifications, provides automatic classification of ru[...] diameter in 28 categories, and can h[...] over 100 wheels per hour. Using the [...] car wheels at the Johnstown, Pa., pla[...] Bethlehem Steel are said to be insp[...] visually and automatically at the ra[...] more than one wheel per minute. A di[...] console provides panel indication[...] "Over," "Under" and "OK" on each di[...] sion gauged, and a signal for each of [...] 28 size categories. Gauging element[...] mechanical, electrical, or pneumatic. [...] gauge also operates as an integral part [...] wheel conveyor system designed and [...] nished by the Planet Corp., Lansing, Mi[...] A visual inspection station and wheel tu[...] are provided adjacent to the gauge. [...] gauge operator marks each wheel with [...] diameter classification and dispatches it [...] to an appropriate location for further p[...] essing. Airborne Instruments Labora[...]

For more information, circle 11-1[...] card following page 52.

Electric Cleaning Unit

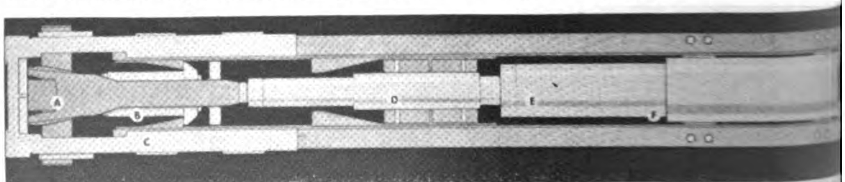
The self-priming Hydra-Clean pump [...] signed for application of cleaning c[...] pounds delivers 2 gpm with 425-psi no[...] pressure at 1,750 rpm. The ¾-hp m[...] operates on 115-volt power, pro[...]

(Continued on page 13)

Hydraulic Shock Absorption Gear

The M-20 LadingGard combines mechanical and hydraulic shock absorption into one assembly which cushions shock between cars at speeds up to 12 mph. The draft gear cushions heavy buff impacts through the use of a hydraulic shock absorber coupled in series with a special friction draft gear. When buff loads are encountered, the coupler moves inward, compressing the draft gear and the hydraulic cushion unit serially. The buff load is transmitted to the car underframe through the cushion gear stops and the rear draft lugs. The unit is a[...] cable to existing rolling stock with a m[...] mum of structural modification. During [...] past year it has been tested in the Mi[...] Research Complex and in field perform[...] by the Western Pacific. Results are sa[...] have met, or exceeded, the most rig[...] standards for high-capacity draft ge[...] W. H. Miner, Inc.

For more information, circle 11-[...] card following page 52.



A—Standard Y-40 yoke and E-60 or BE 60HT coupler; B—Special friction draft gear, 22,000-[...] capacity; C—Large frame or sill couplers and draft-gear carrier solely for vertical suppo[...] components never subjected to axial loads; D—Tubular guide member to support and alig[...] cushion unit drive rod; E—Long bore, long stroke hydraulic shock absorber mounted immedi[...] behind bolster center filler; F—Cutaway section of standard car underframe 6 ft behind bo[...] center filler; G—Set of rear stops which transmit reaction forces in buffing to car under[...]

125 curves in 66 miles with grades up to 1.8% demand severe cycling of diesel power!

Lehigh Valley handles tough terrain and fast schedules with NATIONAL Brushes

TRADE MARK

Between Buffalo and New York the Lehigh Valley maintains unsurpassed service despite stretches of track that push locomotive traction motor and main generator brushes to the utmost.

Miles of steep mountain grades—leading into one curve after another—heavy-tonnage trains, and frequent acceleration and deceleration combine to spell tough railroading for diesel equipment. Keeping on schedule through this rugged terrain calls for dragging and dynamic braking—in short sequence. Through long periods of severe cycling, NATIONAL brushes provide dependable commutation with minimum commutator maintenance.

Here is a prime example of the high reliability of NATIONAL carbon brushes—one key point in a complete program that meets every test of Value Analysis for railroad brushes. This program is available through your NATIONAL brush man, or by writing National Carbon Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto.

Contact Mr. National Carbon

UNION CARBIDE

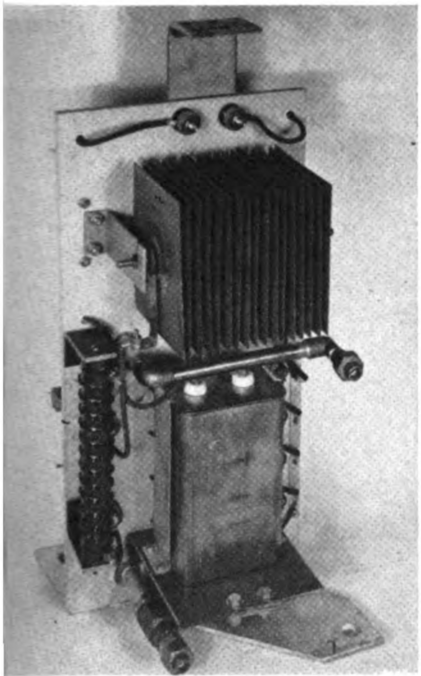
"National" and "Union Carbide" are registered trade-marks for products of

NATIONAL CARBON COMPANY

Contact Mr. National Carbon

(Continued from page 10)
ı-pressure cleaning at locations where supply is insufficient or nonexistent. Low ·ent demands permit using regular 20-› circuits. Built-in recirculation of clean- solution eliminates back pressure and ıtinuously agitates cleaning solution :n spray valve is closed. Light misting strong cleansing spray is regulated with vo-stage valve on the hand gun. Gray Co.

'or more information, circle 11-13 on ł following page 52.



ectifier Replacements

e voltage drop of rectifier assemblies in ich silicon diodes are substituted for ig-rons is said to be only 1 volt as compared the arc drop of 17 volts in the ignitron. e silicon diode conversion assemblies are signed to maintain adequate peak reverse ltage ratio with suitable protection ainst commutation spikes and switching rges. They are said to have higher effi-:ncy and longer life, and to require less ace and cooling water than the ignitrons. herent voltage regulation remains the me as before conversion, and continued ll-load operation is possible even with e failed diode in each of the legs of a six-ase rectifier. Westinghouse Electric Corp.

For more information, circle 11-14 on rd following page 52.

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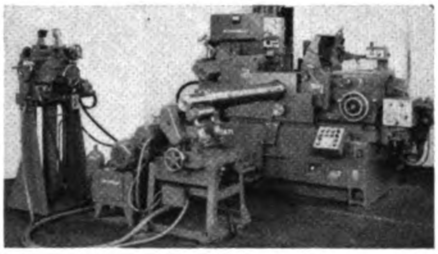
enterless Grinders

ıe end of a car-wheel axle is ground on e Cincinnati No. 325-12 centerless grinder ıile the free end is supported by a power-iven outboard roller support which main-ins precise alignment. The full width of e bearing diameter, the dust guard diam-ɜr, and two adjacent radii are ground on ıe infeed cycle. The axle is then turned ıd-for-end by the hydraulic lifting unit ıown at left. In actual installation, the lift-



ing unit is mounted in a pit directly below the axle between the grinder and outboard support. The grinder, which handles three sizes of axles, has a 14½ in. wide grinding wheel and a 40-hp drive motor. Hydraulically actuated profile attachment is used for truing, and an electro-hydraulic dual-rate infeed unit automatically controls rough and finish grinding. Arranging two grinders in tandem, eliminates turning axles end-for-end. Cincinnati Milling Machine Co.

For more information, circle 11-15 on card following page 52.

Protective Cream

Kerodex No. 51, a greaseless and stainless cream, is said to block direct skin contact with materials which are both skin irritating and sensitizing to allergic individuals. Its glove-like barrier film, it is said, does not affect the skin or materials handled. Kerodex No. 55 offers a greater degree of blocking action where there is constant or extended exposure to irritating materials. Ayerst Laboratories.

For more information, circle 11-16 on card following page 52.

Maintenance Kit

The No. 500 "on the job" freight-car maintenance kit contains an assortment of one-piece, self-locking fasteners for repair-track work. The fasteners are packaged in compartmented cartons labeled for size — 6 pieces ⅜-16, 15 pieces ½-13, 15 pieces ⅝-11, 2 pieces ¾-10, 8 pieces ⅞-9, and 1 piece 1 in-8. Elastic Stop Nut Corp.

For more information, circle 11-17 on card following page 52.

Flaw Detection

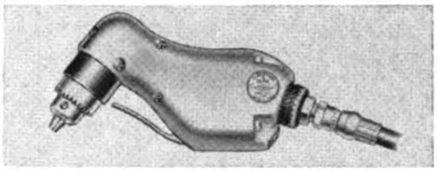
The Tri-Pac kit is for use in detecting flaws in any metal surface, regardless of size or shape. It is composed of three 12-oz Dy-Chek aerosol cans — penetrant, remover and developer. No special equipment is required. Turco Products, Inc.

For more information, circle 11-18 on card following page 52.

Glass Bead Cleaning

A magnetic separator is used to make microscopic glass beads free of iron contamination. The beads, used in cleaning carbon and "varnish" from diesel-engine pistons, are made through a Glas-Shot process which is said to do the work of soft abrasives at a hard abrasive rate. Microbeads.

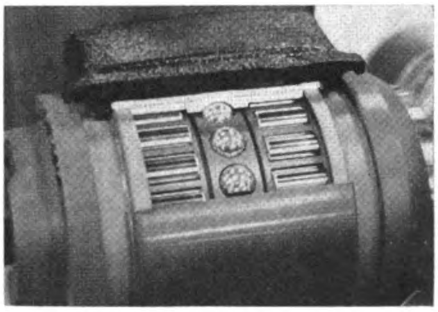
For more information, circle 11-19 on card following page 52.



Air-Powered Tools

The "S" series line of all-angle, air-powered tools develop 0.36 hp at 90 psi air pressure and are available with right-hand rotation or reversible motors. Speeds range from 1,000 to 5,000 rpm, and all housings, motors, chucks and clutches are interchangeable. The tool head of the new all-angle electric drill (illustrated) is mounted at a 55 deg angle to the motor housing, permitting use of the drill in places inaccessible to conventional tools. The drill comes with ¼, 5⁄16 or ⅜-in. Jacobs chuck, or with ¼-in. Jacobs collet. The "S" series all-angle ¼-in. hex drive screwdriver comes with direct, positive or adjustable clutch. A special stall drive ¼-in. hex screwdriver is also available. The all-angle ¼-in. square drive nutrunner is also available with direct, positive or adjustable clutch. Albertson & Co.

For more information, circle 11-20 on card following page 52.

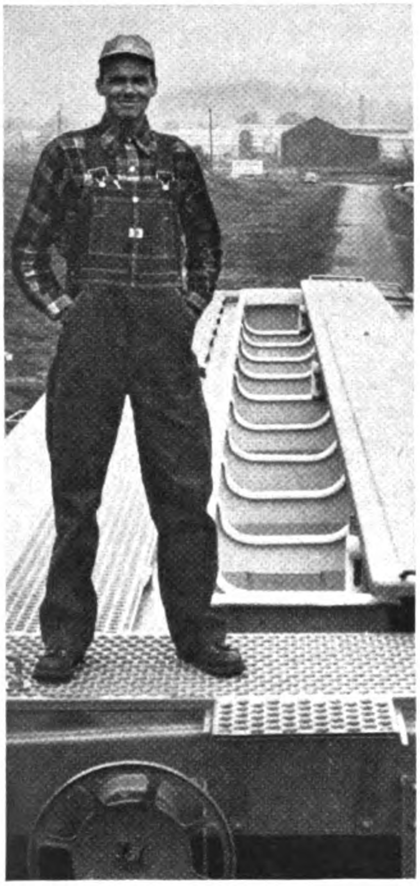


Roller-Ball Bearing

The Absco-NH roller-ball bearing is for high-speed, heavy-duty service in all types and sizes of freight cars. It is completely interchangeable with present roller bearings and has the thrust capacity of the angular-contact ball bearing and the radial capacity of the cylindrical roller bearing. Its radial and thrust load ratings are expected to provide long life. Two rows of large diameter cylindrical rollers carry radial loads only; a heavy-duty angular contact ball bearing carries all thrust loads in both directions. The bearing, a design by Norma-Hoffman Bearings Co., is now under test at the Absco Research Center. American Brake Shoe Co.

For more information, circle 11-21 on card following page 52.

PS-2CD COVERED HOPPERS IN DEMAND:



FOR GRAIN

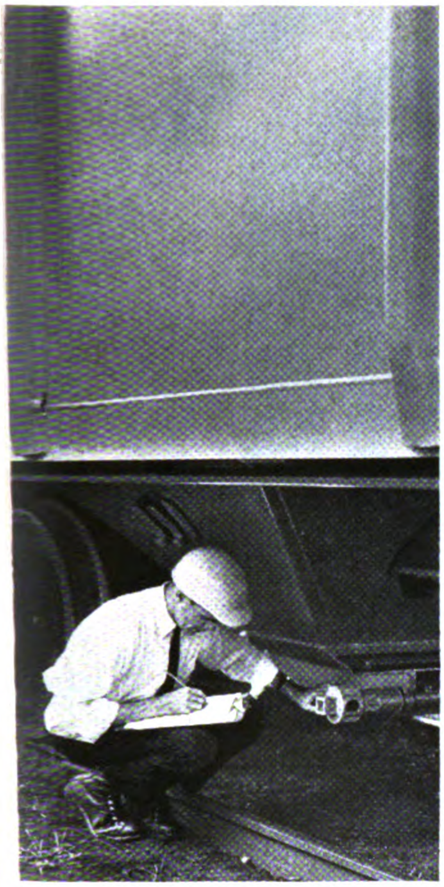
Trough-type loading and extra large cubic capacity—4,000 and 4,427 cu. ft.—are just two of the reasons the Agricultural Industry has put PS-2CD Covered Hopper Cars in demand for the bulk movement of grain and other agricultural commodities. Result: lower transportation and handling costs per bushel—important considerations for shippers and receivers.

FOR MINED PRODUCTS

Center-line unloading, a selection of two or three compartments, and 100-ton truck capacity are major reasons why the Mined Products Industry has put PS-2CD Covered Hopper Cars in demand for the bulk movement of potash, alumina, silica sand and similar products. Overall short car length is important, since it lets PS-2CDs fit existing unloading pits.

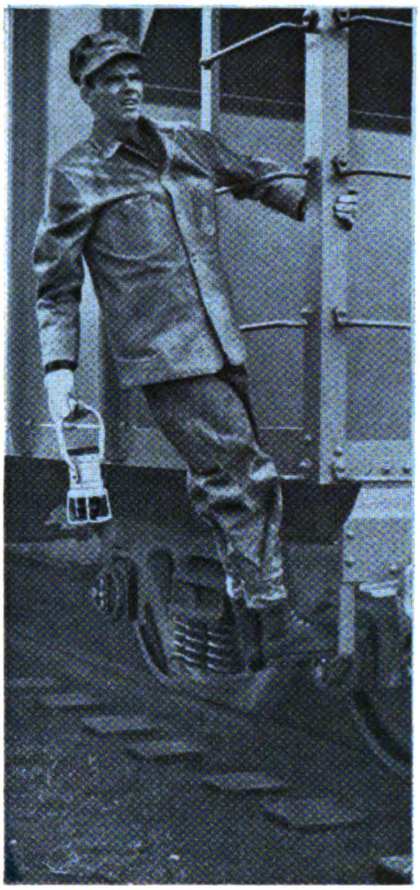
FOR CHEMICALS

Smooth, ledge-free interiors, special linings, choice of 45° or 50° slope sheet angles are just some of the reasons the Chemical Industry has put PS-2CD Covered Hoppers in demand for the movement of powdered or pelleted chemical commodities. In addition, tight-sealing stainless steel hatches and pneumatic outlets help fill sanitary protection requirements.



FOR MATERIALS HANDLING

A selection of fast-acting gravity outlet gates, combination pneumatic-gravity outlets or straight pneumatic outlets, shows why Materials Handling Engineers recommend PS-2CD Covered Hopper Cars for in-plant materials handling systems. Additionally, all three center discharge unloading devices can be one-man operated from either side of the car.



FOR SERVICE LIFE

Combine service-proved rectangular design and center-sill construction with the engineering and production skills that produced the famous PS-2 Covered Hopper and you can see why Railroad Operating and Mechanical Departments are expecting PS-2CD Covered Hoppers to provide long service life. In fact, over 4,000 PS-2CDs have already been put in demand by 16 shipper-conscious railroads.

FOR REVENUE

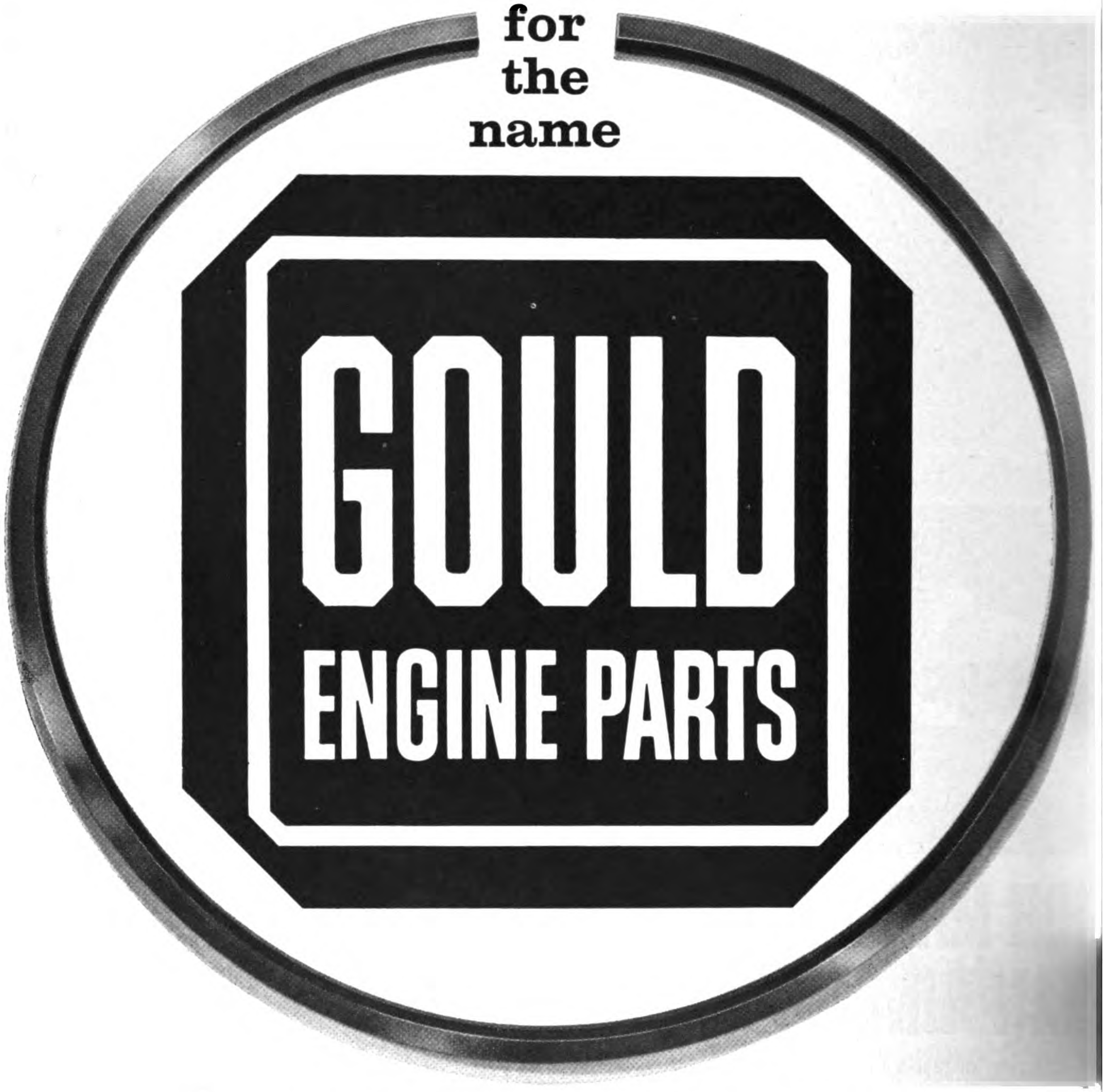
The PS-2CD's high capacity, center discharge design and broad selection of alternate features which supply new versatility in the transportation of agricultural, mined and manufactured commodities, adds up to two words for Railroad Freight Traffic Representatives — Shipper Demand. Translated into terms of new equipment . . . this demand means revenue to the owning railroad.

FOR AN ILLUSTRATED BROCHURE ON THE PS-2CD, WRITE:

PULLMAN-STANDARD

A DIVISION OF PULLMAN INCORPORATED
200 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS
BIRMINGHAM • PITTSBURGH • NEW YORK • SAN FRANCISCO
J. C. FENNELLY CO., REPRESENTATIVE

Look for the name



for superior quality rings

The Gould Engine Parts line of superior products includes Pedrick Piston Rings — known for truly outstanding performance from coast to coast for many years. Pedrick rings are renowned for dependability in all Diesel applications.

To be sure of better and longer performance, insist upon Gould Engine Parts. They are products of one of the nation's largest basic manufacturers of heavy-duty and specialized engine parts. For the widest range of piston ring designs and sizes, in open stock or engineered sets, look for the name Pedrick, a product of Gould Engine Parts.

GOULD NATIONAL

ENGINE PARTS DIVISION/Gould-National Batteries, Inc., Phila. 42, Pa.

Leading Class I railroad reports freight car flooring savings:

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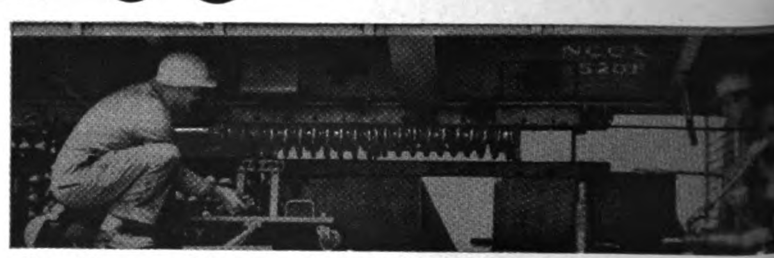

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Editorials

ıe Big Show

: big October 9-16 show at Chicago was undoubtedly railroad industry's best. The meetings were excellent; exhibits were most impressive. The only complaints heard were made by folks like ourselves who had to vive the strenuous routine of the eight-day exposition. th so much favorable comment to guide those who did h a wonderful job in staging the show, tentative plans re been made to have a repeat performance, possibly 1967.

nscheduled Costs, Too

aims made for locomotives should be backed up by uivalent performance in service. This position was ten by committees of the Locomotive Maintenance Offi-rs Association during its October 14-16 annual meeting Chicago and also voiced by a number of mechanical de-rtment officers during discussions of the reports.

The committee dealing with a general discussion of gher horsepower locomotives noted that claims for aintenance cost reductions are based on scheduled main-nance requirements and do not take into consideration e unscheduled work caused by failures. The report com-eted under the chairmanship of T. W. Bellhouse, super-tendent mechanical department, St. Louis Southwestern id later revised and presented by the committee headed r L. M. Allison, master mechanic, St. Louis-San Fran-sco, made a number of points about this situation.

Talking about allocations for maintenance, the commit-e said: "There is no fat in these budgets to cover up un-heduled maintenance whether caused by poor design, or workmanship in manufacture, or poor maintenance y our forces. Our committee feels that we on the rail-ads will take the responsibility for, and correct at our xpense, any faulty workmanship (railroad) that is caus-ig this unscheduled maintenance. We feel strongly that ianufacturers should more fully accept their responsibility ı cases of design or manufacturing faults. In many cases, ianufacturers have done this, but in too many cases the ervice department and the engineering department of the ianufacturer seem to be working for entirely different eople. We believe that this is caused by failure of the ngineering departments to accept their full responsibility. Ve feel that unscheduled maintenance caused by design ilures should be paid for by the manufacturers' research nd development budgets rather than from our mainte-ance budgets."

We could quote other similar passages from this report nd also from the report on diesel engine maintenance eaded by G. W. Niemeyer, mechanical superintendent, Aissouri Pacific, as well as comments by individual speak-rs, but these quotations would only be redundant. If the tatements were made only by railroads trying to "pass he buck" and cover up their own maintenance deficien-cies, we would ignore these complaints. However, we have confidence in the maintenance men "going on rec-ord" and we respect both their ability and their judgment.

We also respect the integrity of the locomotive builders. We are sure that they are no less interested in producing trouble-free locomotives than the railroads are in getting them. It is embarrassing both to the builders and the rail-roads when locomotives do not deliver the performance with which they have been "tagged" by advance billing.

Failures create unscheduled headaches for the builders and unscheduled costs for the maintenance men with "no fat in their budgets."

Design Standards

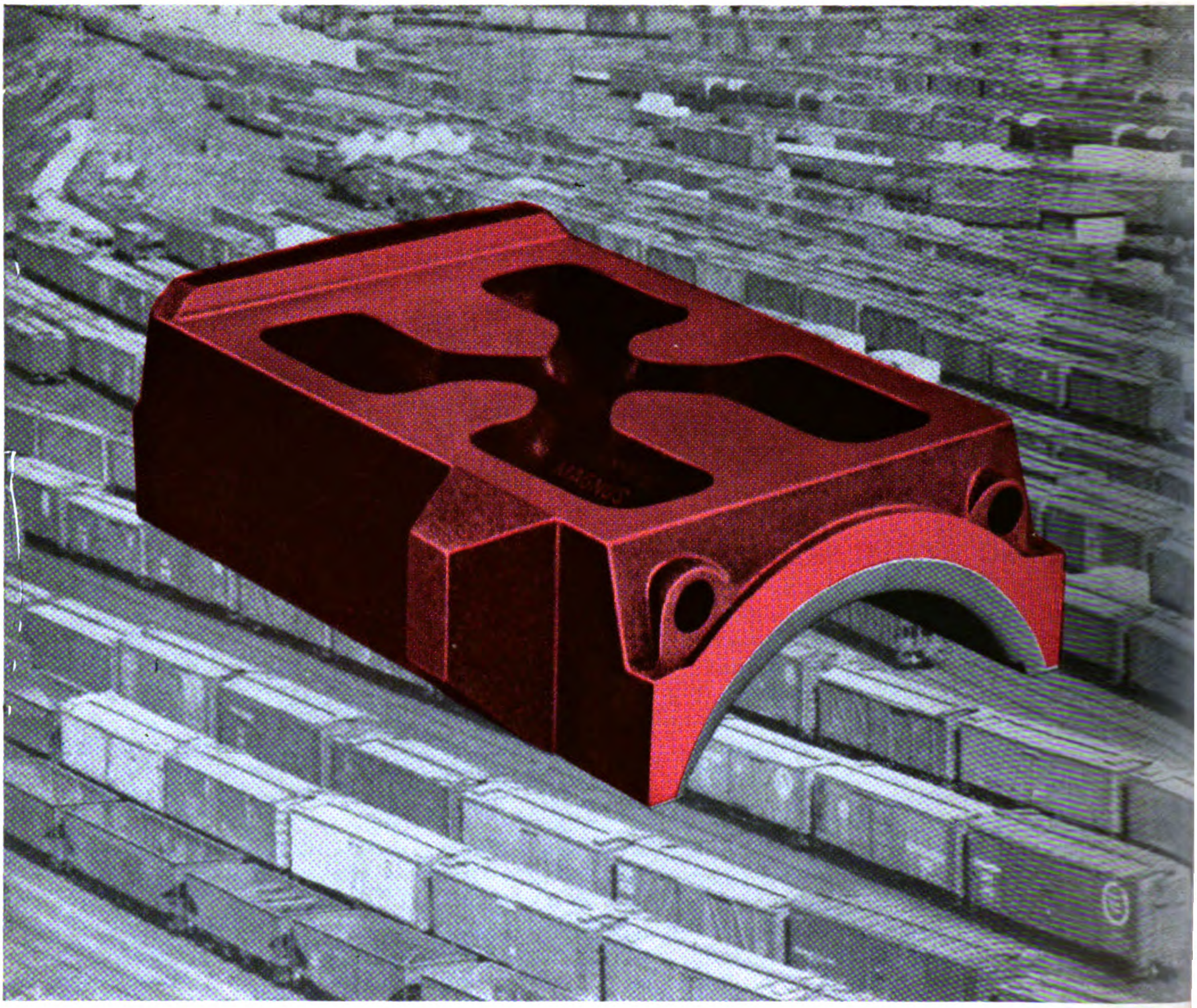
Both locomotive and car design are under study by the AAR Mechanical Division. Design requirements result-ing from these studies, if met by the builders, will go a long way toward eliminating the unscheduled locomotive maintenance of which the LMOA members are so critical and in constructing freight cars that will need no heavy repairs under a 14-year depreciation schedule.

A panel discussion of the "ideal" locomotive at the divi-sion's October 11 annual meeting produced about 60 de-sign requirements that mechanical department men believe should be built into dependable high-performance diesel-electric units. Unlike car design criteria these require-ments can not be made mandatory. Yet the mere fact that the railroads got together, for the first time collec-tively, to establish basic "standards" will have considerable influence with both designers and builders. About the only valid criticism that can be made of these valuable pro-posals is that the railroads delayed so long in taking the initiative on locomotive design.

Considering the magnitude of its work, the task force updating the freight-car design standards has done a re-markable job in getting the voluminous data in shape for review by responsible Mechanical Division committees. With the full cooperation of car builders and component manufacturers in their preparation the new "Fundamen-tals of Car Design", after approval by AAR member roads, will establish design requirements, many of them mandatory, for the freight cars of the future. Already, the car builders with a knowledge of these new, but as yet un-official, standards are being guided by these engineering yardsticks in the design of their new cars.

The work is far more comprehensive than anything pre-viously attempted. As was explained at the AAR meeting, only the 1925 specification for the truss-frame box car ever even approached in scope the proposed new design fundamentals. The 1925 specification was never updated. It was agreed that the 1963 "Fundamentals of Car Design" must be revised regularly to be kept abreast of the rapidly changing freight field.

There is not much glamour in design standards, but they are very important to the engineers asked to produce those highly serviceable, "maintenance-free" locomotives and cars the railroads want and need. We are not naive enough to believe that a maintenance-free utopia will be achieved but we believe that we can get closer to that goal than we are at present. The new design standards will help us move in that direction.



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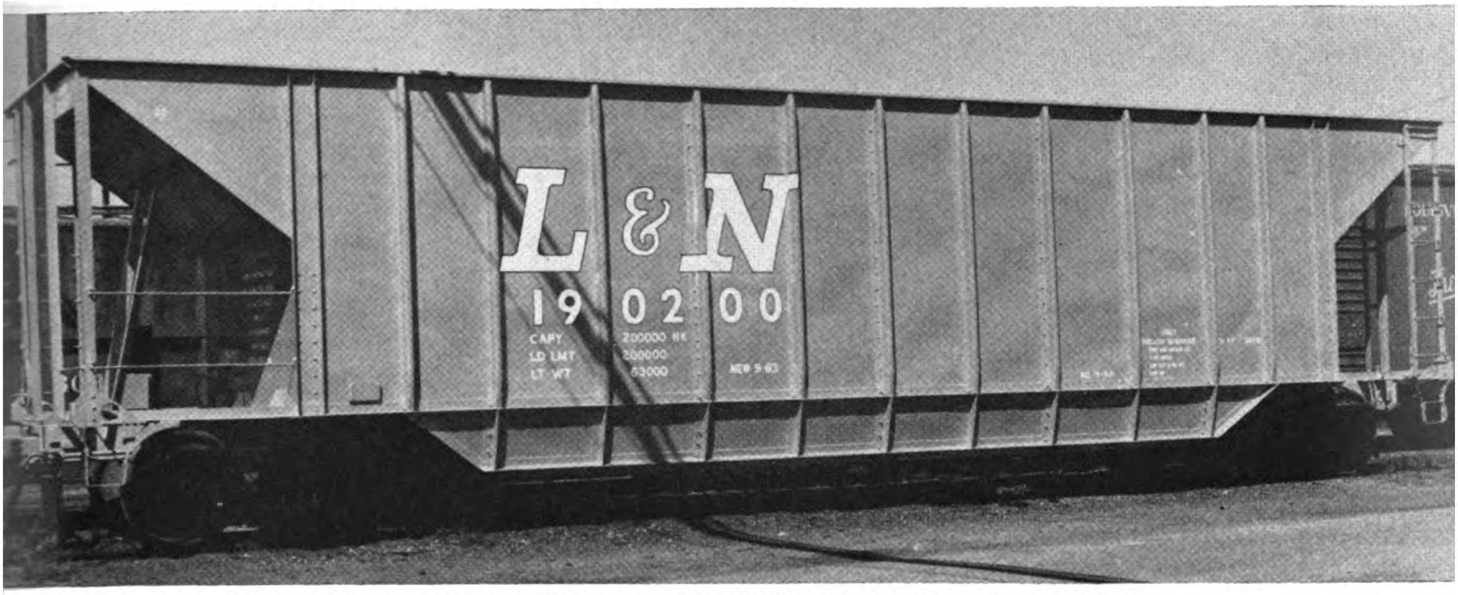


ɔngitudinal doors, arranged so coal is not deposited on rail, are powered by electric motor. Cars will operate in solid trains.

Five Alloy Steels Used in L&N Hoppers

New design, using high-strength materials, shaved 4 tons from prototype weight. Cars used in integral coal trains.

Five alloy steels are being used in ıe construction of the new L&N 00-ton quick-unloading hopper cars ɔr integral coal-train operation. The teels are USS Cor-Ten, Tri-Ten, T-1, '-1A and stainless. The 50 cars, modıed and improved versions of a proɔtype built by the L&N early in 1962 RL&C, April 1962, p 22) are under onstruction on the road's new freightar-assembly line at its car shop in outh Louisville, Ky. The line pro-uces one car each working day.

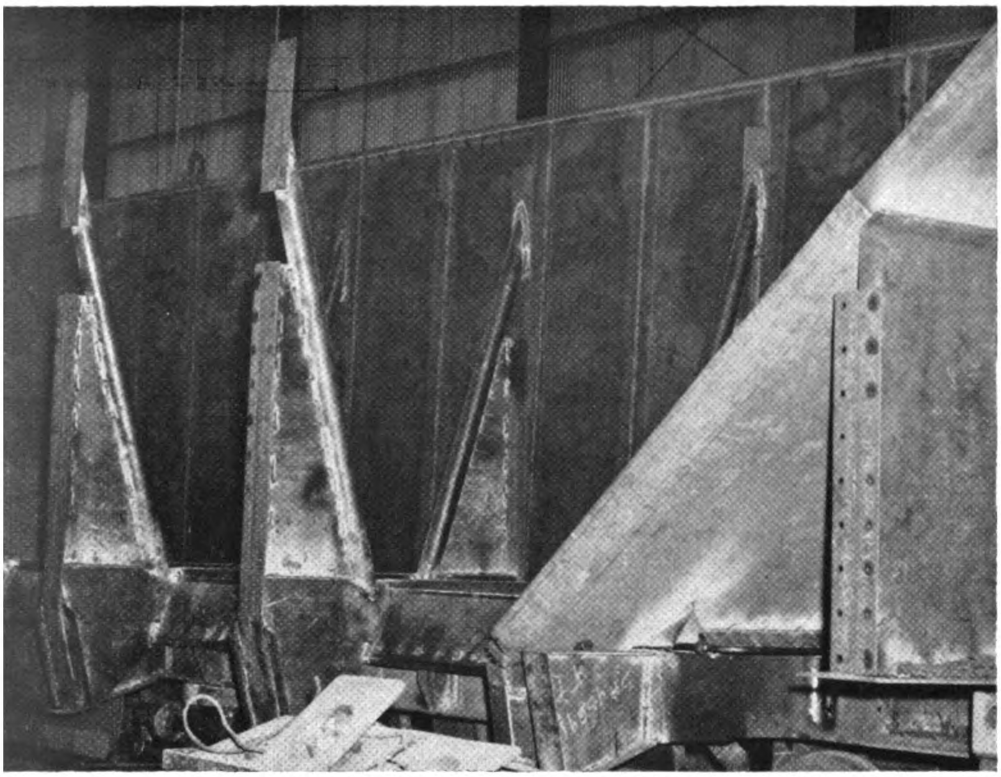
By careful steel selection, L&N ngineers were able to trim 8,400 lb rom the weight of the carbon-steel ırototype car to produce a light weight ıf 63,000 lb in the production cars. n place of ordinary carbon steel, vhich has a yield strength of 33,000 ısi, several alloy steels which have ıuch greater strength per unit weight vere utilized. These included:

- Cor-Ten, a 50,000-psi yield-ɔoint alloy which resists corrosion and ıbrasion, is used for all sheets contacting lading and for most of the side posts;
- Tri-Ten, a 50,000-psi yield-point alloy with about twice the atmospheric corrosion resistance of ordinary steel, was used for many secondary structural members, including the bulb-angle end plates and top chords, and the four bolster side posts which must provide key structural support.
- T-1 and T-1A, 100,000-psi yield-point materials in rolled and cast form are used for highly stressed structural components such as intermediate sills, header sills, body bolsters, diagonal braces;
- Type 410 stainless, an alloy which retains its smooth surface, used for lining slope sheets so that the lading will be discharged rapidly.

With these alloy steels it has been possible to use thinner sections and gages than were used in the prototype built 18 months ago.

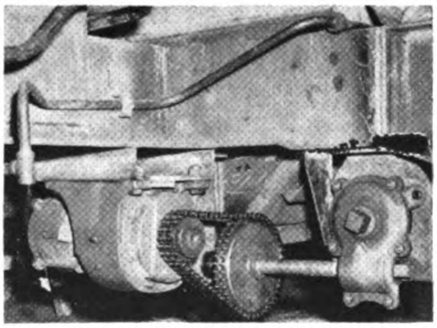
The prototype has been widely tested to determine if it met shipper requirements. L&N officers say that the fleet of 50 cars is scheduled to shuttle between western Kentucky coal fields and generating plants of the Tennessee Valley Authority along the Tennessee River in Alabama—a 24-hr round trip of 450 miles. The cars may be unloaded while moving with doors being operated either manually or by remote control from a track-side station.

The cars are arranged with eight sets of longitudinal double doors hinged on both sides of two intermediate sills which are directly over the two rails. The center sill at each end of the car is joined to these intermediate sills by transverse header sills just inboard of each truck. The motor-operated doors, designed to eliminate spilling coal on the track, open in 6.4 sec, dump the coal in 12 sec, and are closed and locked in 7.4 sec. Electric power for the motor can be applied to the car either by contacts on

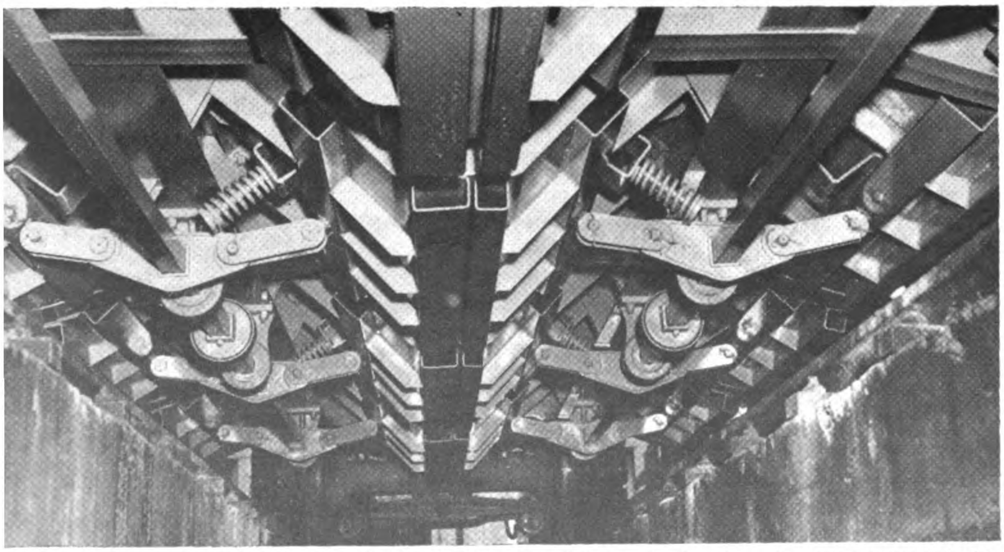


Interior is designed with minimum of obstruction to flow. Portions of body which contact lading are fabricated of Cor-Ten. Riveting and welding are used in assembly.

Header sill is welded to one of wide-flange beams which are used for intermediate sills.



Motor, mounted under header sill, drives through sprockets and chain to worm gears.



Openings make up practically all of bottom of car between trucks. Two sets of longitudinal double doors are powered by shafts which run length of car below the intermediate sills.

the side of car or through a receptacl on one end.

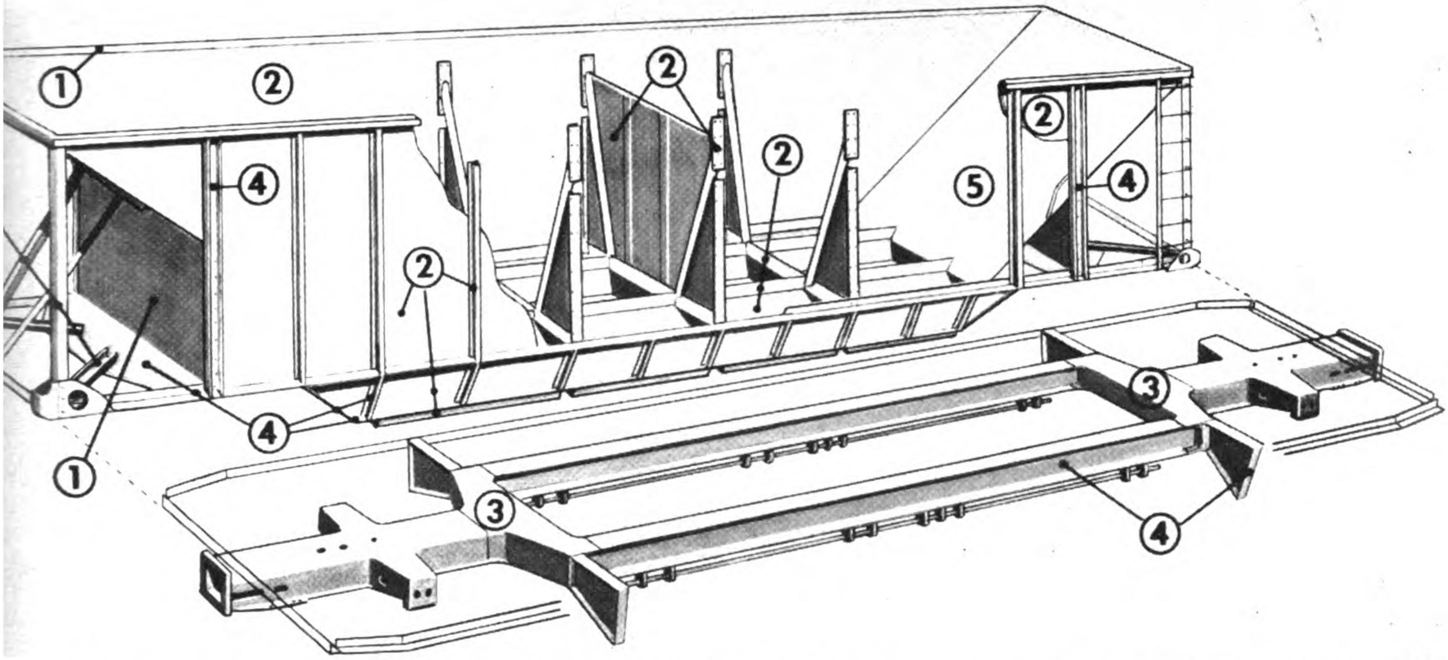
The 10-hp, 440-volt, 3-phase, 60 cycle General Electric motor i mounted transversely of the car's cen terline on the underframe 53¾ in back of the centerline of the truck bolster at A end. The motor is dus water, and explosion proof. A sprocke and chain connection between th motor and a cross-shaft operates tw 2½ in. square steel longitudinal doo operating shafts through an Enter prise worm-and-gear drive. Thes longitudinal shafts, mounted in sealed self-aligning roller-bearing pillov blocks, are arranged with a series o L&N-designed trip couplings whic allow the doors to unlock in sequenc and fall open all at the same time The trip couplings are also synchro nized so that the load of coal actin on the first set of unlocked doors help the motor to unlock and drop the suc ceeding sets of doors. The doors ar locked by worm gears, levers and con nected arms which move past a cen terline between the centers of the ex treme hinged points of the levers an arms.

Car Dimensions

The cars are 50 ft 5 in. over striker and 49 ft 4⅝ in inside the end sheets Inside width is 9 ft 7¾ in.; overal width, 10 ft 4 in.; overall height, 13 ft Body capacity is 3,600 cu ft level ful and 4,000 cu ft with a 10-in. heap Each of the four door openings i 24 ft 10 in. long. Car weight is 63,000 lb.

The L&N designed cast-steel draf sill extends 54¾ in. inside the bol ster with the face of the striker 6 ft 6 in. outboard of the bolster center The sill is cast with integral strikers body center plate, bolster center filler and front and rear draft lugs. The cast transverse header sills of T-1 steel are placed between the draft sills at each end and the intermediate sills which are a pair of wide-flange, 14-in., 43-lb T-1A beams spaced 60 in. apart Draft gears are supplied by W. H. Miner; couplers, by Symington Wayne.

The ¼-in. Tri-Ten bolster top web plate extends from side sheet to side sheet. It is welded to the floor sheet and flanged at the top to fit the floor sheet slope. A 20- x ¼-in. T-1A bot tom cover plate extending to the cen ter sill braces each Stucki side bear ing. The ⅜-in. T-1A body bolster



loy steels used in car include (1) Tri-Ten; (2) Cor-Ten; (3) T-1 castings; (4) T-1A rolled sections and plates; (5) 410 stainless. L&N cut over 4 ns from light weight of car by using high-strength alloys in place of carbon steel used in its prototype hopper.

ɔver plate, extending from side sill ı side sill, is 44 in. wide for 20 in. ıch side of the car's centerline, and ıen tapers to 14 in. at the side sills. his plate is welded to the bolster ebs, side sills and center sill. Two 2- x ¼-in. Tri-Ten gussets are used : each bolster, flanged and welded to ıe floor sheet and welded to the ɔlster web, top cover plate and side f center sill. The four 6-in., 10.5-lb -1A channel diagonal braces are elded to the top side of the ⅜-in. ɔlster top cover plates and riveted ı the corner castings. Space between iagonal braces on B end of car perıits removal of AB valve.

Each of the three built-up crossɛarers consists of a ¼-in. Tri-Ten eb plate between intermediate sills, ¼-in. Cor-Ten plates from the interıediate sills to the side sheets, a 6- x ¼-in. T-1A bottom cover plate exnding from side sill to side sill, and 4- x ¼-in. Tri-Ten curved plate on ıp of the crossbearer web. The three ıe-piece $^3/_{16}$-in. T-1 crossridge sheets ctend across the car from the peak f the crossridge to the hopper door ames. The center crossridge is reinırced by a $^5/_{16}$-in. Cor-Ten plate exnding between the two diagonal races. The six crossridge braces of ¾-in. OD Cor-Ten tubing extend om tops of the side sheets to the tops f the intermediate sills and are welded ı ¼-in. Cor-Ten plates which are veted to the crossridge braces through ıe sides of car and the side post anges.

Side sheets are ⅛-in. Cor-Ten plate butt-welded together on the flanges of the side posts. Panels adjacent to the bolster posts are $^3/_{16}$-in. Cor-Ten. The side sill is a 3½- x 3½- x ¼-in. T-1A angle extending from end sill to end sill with one horizontal leg extending outward. End sills and corner posts are the same size. The 50-ft 3-in. top side plate is a 4- x 3½- x ⅜-in. Tri-Ten bulb angle. Vertical legs of the top side plate and side-sill angle are welded to the side sheets. Side sill reinforcements are 4- x 3- x ¼-in. T-1A angles. Bottom side sheets are $^3/_{16}$-in. Cor-Ten plate between the side sill and side sill reinforcement.

Side Framing

The 22 outside side posts per car are $^3/_{16}$-in. T-1A pressed U-shapes with flanges riveted and welded to the side sheets and welded to the side sill and side plate. The four 9-in., 13.4-lb T-1A channel posts at the body bolsters are reinforced with 3- x 4- x ¼-in. T-1A angles each side of the bolster web plate. Body bolster side post, side sheet and reinforcing angles are fastened with ⅝-in. rivets. Tops of all side posts are tapered to permit welding the side posts to the underside of the side plate angle. Side post extensions at bottom are 4- x 3- x ¼-in. T-1A angles between the side sill and side-sill reinforcement angle.

The hopper is formed of $^3/_{16}$-in. Cor-Ten and T-1 plate. The 16 hopper doors are $^3/_{16}$-in. pressed Cor-Ten plate with hinges and reinforcements also fabricated from $^3/_{16}$-in. Cor-Ten. Longitudinal reinforcements are Cor-Ten angles and tubing. All doors are the same length—5 ft 5½ in. The eight outside doors are identical as are the four right and four left inside doors. Longitudinal hoods of $^3/_{16}$-in. Cor-Ten cover intermediate sills.

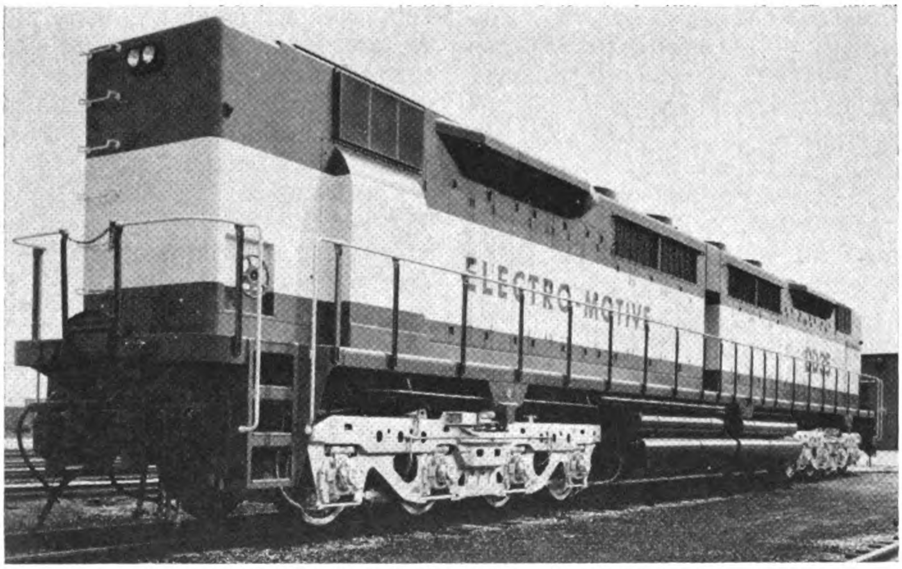
The one-piece, $^3/_{16}$-in. Cor-Ten end floor sheets extend from car end to body bolster and have a 38-deg slope. They are braced with a 3½- x 3½- x ¼-in. T-1A angle approximately midway between the bolster and end. Intermediate floor sheets are $^3/_{16}$-in. Cor-Ten extending from body bolster to hopper-door opening. The floor sheets at sides and ends are flanged up with a 3-in. inside radius. End floor sheets have a spot-welded 20-gauge, type 410 stainless-steel lining to give a smooth surface which will permit quick lading discharge. The T-1A steel door frames are L&N design.

Trucks are 100-ton ASF A-3 with narrow-pedestal side frames for 72-in. wheel centers and equipped with 6½ x 12 Hyatt roller bearings, 2½-in. travel springs, and ASF No. 18 unit brake beams with Anchor composition brake shoes. Wheels are USS 38-in., one-wear wrought-steel type mounted on AAR alternate-standard axles machined between the wheel seats. Truck springs are single heat-treated and shot peened. Inner coils are alloy steel.

(Continued on page 47)

Three U50 units now in service are to be joined by 55 more which UP recently announced would be ordered from General Electric during 1964. Normal consist will be three units.

GE and GM Complete First 5,000-Hp Units



Four-axle trucks, a diesel-electric "first," are featured on the DD-35. Big General Motors locomotive is scheduled to serve as demonstrator, coupled behind regular cab unit.

A pair of 5,000-hp, two-engine diesel-electric units attracted much attention at last month's American Railway Progress Exposition in Chicago. For the first time the General Electric and General Motors entries in the ultra-high-horsepower locomotive competition went on public display. Due to be completed before year's end is the third competitor in this power race—the Alco 5,500-hp Century 855.

The 566,000-lb General Electric U50 at Chicago was one of three units ordered from that builder earlier this year by the Union Pacific (RL&C, July 1963, p 59). Just a few days prior to the Exposition, A. E. Stoddard, UP president, stated that his road will order an additional 55 of these U50's from GE next year. In addition to its GE orders, UP is scheduled shortly to receive the first three Alco Century 655's. These Alcos were ordered at the same time as the first three U50's.

No orders have yet been announced by any railroad for the General Motors DD35, a 5,000-hp, 488,000-lb booster unit which an Electro-Motive spokesman earlier said (RL&C, June 1963, p 53) was being offered as a "unit-reducing block for meeting high horsepower requirements of railroads operating increasingly heavier trains at higher speeds." The DD-35 is powered by two 16-cylinder 567-D3A diesels, each of which delivers its power to the four traction motors on one of the unit's pair of eight-wheel "fully flexible" trucks. GM points out that its big booster unit and one of the new 2,500-hp GP-35's can replace five 1,500-hp freight units. The DD-35 has no control cab—only hostler controls—and is intended for operation behind a GP-35 or any of the other cab units which are now in railroad motive-power fleets.

"These locomotives are designed to provide U.S. railroads with greater locomotive performance and operating economy in multi-unit consists," R. L. Terrell, GM vice president and EMD general manager, said recently. "The cabless DD-35 brings a new dimension to the unit principle in motive power which was pioneered by EMD in the mid-30's."

The DD-35 is 87 ft 11 in. over coupler pulling faces and 15 ft 9¾ in. from rail to tops of stacks. Fuel tanks hold 5,200 gal. The two-cycle turbo-charged 567-D3A engine operates at 900 rpm—65 rmp faster than the 567-C and 567-D engines. Several components of the power assembly have been redesigned to burn the increased fuel needed to produce the higher horsepower, but bore and stroke remain unchanged.

The U50 has the same B—B+B—B wheel arrangement involving a pair of four-wheel trucks under a span bolster at each end of the carbody which has been used on the UP 4,500-hp gas-turbine locomotives. It is 83 ft 6½ in. over coupler pulling faces and has an overall height of 16 ft 10⅞ in. Prime movers are four-cycle FDL-16 turbo-charged diesels. Fuel capacity is 5,850 gal. Locomotive details were published last month (RL&C, October, p 72).

When the UP first indicated its interest in high-horsepower diesels, President Stoddard said that studies of his road's through freight services have shown the need for locomotives of 15,000-hp rating or more. It is planned that three of the 5,000-hp or 5,500-hp units will normally be operated in multiple.

Designs Concern Mechanical Division

Interest in more comprehensive standards for locomotives and freight cars is indicated by topics at annual meeting

"Constructive discontent," cited by the principal speaker as vital in cutting costs and raising productivity, has been evident in most recent AAR Mechanical Division activities including its consideration of current locomotive and car designs. While A. E. Perlman, New York Central president, stressed, in his address at the annual meeting last month, the "discontent"

Technological and competitive developments are producing a new breed of mechanical officer—a breed of man who has developed no "mental obsolescence,'" observes NYC's A. E. Perlman.

'A short time ago many units of equipment on display were just a twinkle in some engineer's eye," says IC's J. A. Welsch, Mechanical Division chairman, referring to ARPE exhibits.

of the industrial engineer as a key to improved equipment maintenance and servicing, he also said technological and competitive developments are producing a new breed of mechanical department officer who is "continually searching for a better standard than is to be found in the materials and methods of yesterday."

Yesterday's AAR standards for freight-car design and construction were rated as obsolete over a year ago when the Division authorized organization of a special car design task force. The result of their work has been preparation of car design specifications which supersede or alter practically all those previously issued and cover many facets never before subject to rigorous standards. They will probably soon be submitted for letter ballot after further consideration by Mechanical Division committees.

Produced through the year-long, full-time efforts of three railroad mechanical engineers who received the full cooperation of car builders and car component manufacturers, the "Fundamentals of Freight-Car Design" would take into consideration the longer, higher, heavier capacity and more sophisticated cars which are being designed and built today.

The 250-page specification, while establishing maximum allowable stresses and minimum design criteria, would make no effort to fix car configuration, only aiming to insure trouble-free, safe operation of rolling stock. These design fundamentals, if approved, would be mandatory for all new cars and would be recommended strongly for cars undergoing major rebuilding.

The average American railroad might need three sizes of locomotives for its road operations. That was the consensus of a panel of motive-power officers who were formulating standards for the ideal locomotive design. The three sizes would be medium (1,500 to 2,000 hp), medium high (2,000 to 3,500 hp), and high horsepower (3,500 to 5,500 hp) locomotives.

The panel said the 1,500 to 2,000-hp freight unit can be utilized to good advantage by railroads operating a large number of mainline freight units in branch line, transfer, mine run and switching services. Going over locomotive design from the rails to the roof, the panel made about 50 suggestions on what locomotive components should do and how they should be designed.

In discussing general design characteristics, the panel said the ideal locomotive would be a hood type with a low, short hood forward to produce good visibility. It would be designed for ballasting to obtain 62,000 to 68,000 lb axle load at rail with 40-in. wheels. It would operate in the 75 mph speed range and negotiate a 20-deg curve when in multiple unit. The engine would not require a high-cost premium fuel, and fuel capacity would permit 1,000-mile operation consistent with axle-load restrictions.

The builders should explore the possibility of an alternator-rectifier in place of direct-current generator and elimination of commutators on all electrical equipment. Magnetic or static contactors should be used in place of electro-pneumatic type control to eliminate moving and rubbing parts.

On maintenance, the panel said continued progress in new locomotive design and developments results in obsolescence of older locomotive. Therefore, when obsolescence governs the life of a locomotive from, say, 12 to 14 years, then the engine and electrical equipment should be so designed and constructed to permit continued operation without having to perform heavy repairs until mid-life—6 to 7 years—with only one light repair between new locomotive and mid-life and one light repair between mid-life and time locomotive is retired.

The ideal diesel engine should perform at least three to four years without needing other than routine running maintenance attention. All locomotive components should be readily removable without having to remove adjacent components. Equipment

should be arranged so that removal and reapplication can be performed by the use of only one craft. Component parts should be warranted for full two-year minimum life with warranty covering labor cost for changeout if working parts fail in less than two years.

Common sense, good economics, and constructive discontent—the basic ingredients of all industrial engineering—are finding increasing application in solving mechanical department problems, Mr. Perlman told the Division in his opening address. "Reducing costs and raising productivity will become more and more important, more and more an essential ingredient in keeping the railroads the most efficient form of mass transportation the world has ever known."

Many mechanical officers have had a suspicion of the professional industrial engineer—a man trained to study problems analytically, Mr. Perlman said. "Yet these men can concentrate with the time and techniques necessary to determine significant factors in industrial problems which traditional railroaders might overlook . . . The officer who faces a heavy burden of administrative duties will not have the time to equate all the detailed data required."

Typical of the concerns of industrial engineers in the New York Central's mechanical department are the following:

- Construction of freight cars;
- Servicing of locomotives;
- Inspection of locomotives and cars at terminals and in yards;
- Cleaning of locomotives and cars;
- Performing running repairs on locomotives and cars;
- Making shop repairs on locomotives, cars and parts;
- Studying utilization and replacement of equipment and facilities;
- Demolition and salvage of retired equipment.

These activities involve them in work simplification, layout improvement, time study, process specification, manpower control, materials handling, equipment design, quality control, material and work flow, capacity utilization and production control. In all instances they are responsible for the economic justification of project expenditures. Throughout the railroad industry today, industrial engineers are engaged in redesigning shops to obtain the advantages of mass production techniques both in the construction and repair of equipment. Cars and motive power are being evaluated to determine if they are obsolete.

"The revolution in competition and technology forces a drastic re-evaluation of standard practices, and railroad mechanical departments today find it necessary to search for new materials and methods to meet these rapidly changing conditions," Mr. Perlman pointed out. "Despite a long history of technological innovation, certain railroad tools and practices tend to become fixed and standard. Just as in many other long-established industries, some methods go unchanged, indeed unchallenged, for many years. Railroads have grown in size until their operations are extremely complex and far flung.

"As a result, managers who face the daily task of administering a vast enterprise sometimes find it necessary to rely upon standard plans and instructions in the same manner that our huge military organization controls its complex, world-wide operations. The explosively expanding technology and rapidly changing competitive factors of recent years have forced rapid obsolescence of most of these once-reliable standard plans and instructions."

Ideal Road Locomotive

The ideal locomotive for road service, in addition to characteristics listed above, should have many other features, according to the nine-member panel: P. J. Finch (moderator), assistant superintendent motive power-diesel, C&O.; W. H. Cyr, chief mechanical engineer, CNR; W. P. Dadd, general superintendent motive power, B&O; J. T. Daley, chief mechanical officer, A&S; R. I. Fort, electrical engineer equipment, IC; W. L. Huebner, assistant to general manager-mechanical, Sante Fe; H. Rees, assistant general mechanical engineer, UP; G. R. Weaver, assistant chief mechanical officer-motive power, PRR; and E. H. Wright, chief mechanical superintendent-locomotive, NYC.

General Characteristics: Hood type with low, short hood forward. Design suitable for ballasting to obtain 62,000 to 68,000 lb axle load with 40-in. diameter wheels. High capacity, anti-friction, grease-lubricated journal bearings.

All units to be capable of being operated in multiple with each other and functions of individual m-u trainline wires to be in accordance with AAR standard. Optional feature: a fuel-oil heater suitable for operation at ambient temperature of —40 deg F.

Underframe and Chassis: Underframe of sufficient strength to eliminate bending under impacts, designed to withstand 10 G longitudinal force. Underframe preloaded prior to applying equipment pads to assure their proper alignment. Underframes must be truly horizontal when fully loaded. Nose end provided with adequate collision posts. Adequate end post lifts at each end for handling locomotive with wrecking crane in addition to bolster lifts and jacking pads.

Body and truck center plates designed to carry loads adequately. Wear plates to be non-metallic with proper lubrication to secure long service. Cab windshield adequately defrosted with an electric defrosting arrangement optional. Adequate current supply to provide for additional auxiliary electrical power for components which may be required, such as electrically heated windshields, thermo-electric water coolers, etc. Accessible space for application of equipment such as train stop, automatic train control, and radio, with compartment adequately ventilated to protect static equipment. Toilet as basic equipment with provision for heating water tank if flush type is used. Cab heating system to maintain a uniform minimum temperature of 50 deg F in cab when ambient is —40 deg F.

Lubricating-Oil System: Full-flow lube-oil filtration. Sufficient lube-oil filters to permit a minimum of 30 days between filter changes. Adequate lube-oil cooling for ambient temperature for 125 deg F at continuous full-throttle operation. Engine to be capable of using lubricating oils presently in common use.

Engine-Cooling System: Engine cooling system designed for ambients of 125 deg F to —40 deg F. Radiator design capacity to be at least 15% greater than the actual requirements for a new locomotive, allowing for reduced efficiency with service. Au-

merican Railway Progress Exposition's track exhibits at Illinois Central 31st Street Yard in Chicago included many new cars and locomotives exemifying rapid developments which have caused Mechanical Division to prepare new design standards and recommendations.

ıatic drains for engine, radiators, and ·ater piping to protect cooling system water drops to 35 deg F.

Sanding System: Fast operating ınding equipment, adequately con·olled, to eliminate wheel slippage. and to be provided ahead of each ·heel; i.e., sanders on each side of ach wheel. Independent selective ınding; i.e., ability to sand ahead of :ad wheels of each truck on leading ›comotive unit only. Minimum sand apacity of 8 cu ft per wheel. Filler ds designed and located so water annot get into sand. Sand boxes loated so pipe runs are as short as ossible, with location permitting ıaintenance of sand traps and valves.

Air System: Interial or centriıgal air-filtration system to provide ıfficient clean air for engine, main enerator, traction motors, and air ompressor. Clean pressurized air for lectrical cabinets, engineroom and ab. Filtering to eliminate snow and ınd. Adequate cooling air for radia›rs and dynamic brake grids. Air sys:m to operate efficiently at ambients ·om 125 deg F to —40 deg F. Fans › provide increased cooling air for ·action motors, main generator, and adiators when locomotive is in dyamic braking. Speed of tractionıotor blower and air compressor hould not be dependent on engine peed. Air compressor to be water ooled and of adequate capacity. Airrake equipment to be in package form › it can be readily removed to be relaced with an overhauled package. utomatic blow-down for both main eservoirs.

Piping: Welded or flanged fittings › be used rather than threaded fittings. 'iping to be as direct as possible, with o sharp bends. All piping to be seurely bracketed. Flexible connections to be capable of at least five years' service.

Electrical System: Magnetic or static contactors to be used rather than electro-pneumatic type control. Main generator of ample capacity, properly cooled, with good accessibility and with electrical leads located out of dirt. Traction motors more rugged and with longer life and increased capacity. Anti-friction support bearings. Nose supports which will reduce stresses being transmitted. An improved gear case which would be leakproof for use of extreme pressure gear grease or oil.

Fundamentals of Car Design

A five-section, 250-page specification, "Fundamentals of Car Design," will probably soon be submitted for member-road approval by the AAR Mechanical Division. At the Division's annual meeting last month, the shortcomings of present standards along with the benefits which will accrue from adoption of the new Fundamentals were discussed by a panel of railroad mechanical engineers, moderated by N. A. Passur, engineer of car design and construction, Southern Pacific. Their conclusion: The industry has not had adequate car design and fabricating specifications; the new standards will go a long way toward assuring safe, trouble-free cars but will require regular revision to keep abreast of developments in this rapidly changing field.

Proposed standards would be mandatory for all new cars and would be recommended for all cars undergoing heavy repairs. It was pointed out that there has been no attempt to fix car configuration; specifications do establish maximum allowable stresses and minimum design criteria.

The panel included the three members of the Mechanical Division task force who have worked full time for a year in preparing the new standards: C. C. Leriche, assistant engineer car design and construction, SP; W. A. Bostian, shop engineer, N&W; and F. Fahland, retired general mechanical engineer, UP. Other panel members were W. F. Bugg, assistant mechanical engineer-car, PRR; J. R. Douglass, assistant chief mechanical officer, -equipment, L&N; V. L. Green, assistant mechanical engineer-car, Milwaukee; G. P. McGavock, mechanical engineer, N&W; and H. B. Wolfe, engineer car construction, Santa Fe.

Car design in the past was left largely to the individual engineer. The industry did manage to do a "pretty fair job with minimum standards," Mr. Passur commented in opening the discussion. Today's railroads can not operate with cars incorporating design weakness or having components subject to failures. To overcome these deficiencies, the Mechanical Division had to undertake preparation of standards much more comprehensive than had ever before been produced. Members of the three-man task force paid tribute to the excellent cooperation given by carbuilders. The builders formed a general engineering committee, and subcommittees of this organization worked with the task force in the preparation of standardized design calculations and stress analyses and in formulation of fabrication and assembly standards.

(Continued on page 44)

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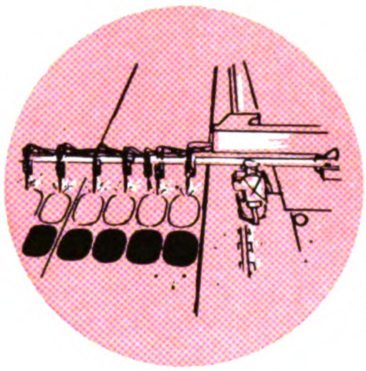

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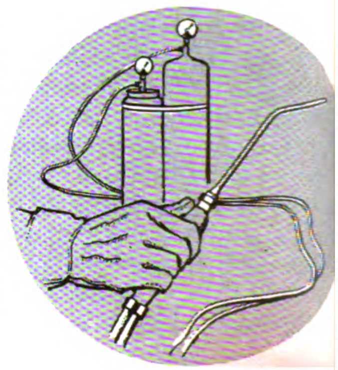

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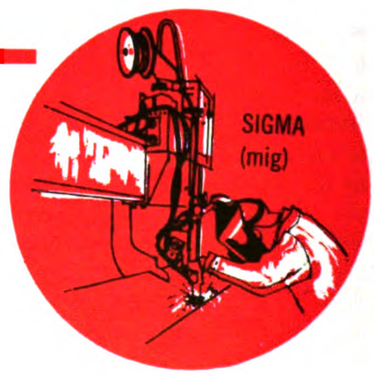

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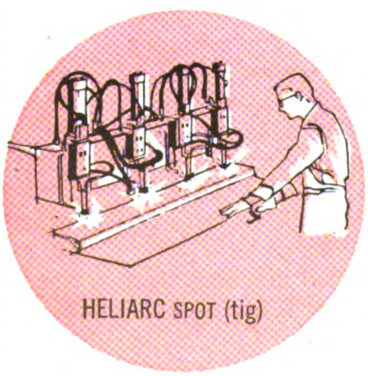

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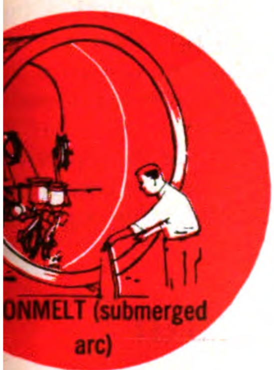

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Bigger Power, Special Cars . . .

Coordinated Ponders Maintenance, Operation

The new, larger motive-power units and specialized freight cars which are coming into use on American railroads are presenting mechanical departments with maintenance and operating problems. Many of these were considered at last month's meetings of the Coordinated Associations—Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers Associations.

"Everything moved today can be transported by other means, and railroads will stay in business only by doing a better job at lower cost," C. E. Bertrand, vice president-operations and maintenance, B&O (now executive vice president, Reading), warned the RF&OOA.

"All railroad men have been challenged to a duel of wits and ingenuity requiring the most resolute determination to apply the best technology we can develop as individuals and as a group towards doing a better job for less money than is possible by our competitors."

After calling attention to the high-horsepower locomotives on display, and to others soon to be delivered or now being planned, Mr. Bertrand continued: "Even more vital to serving a growing nation is the concept of operating freight trains to meet a realistic marketing concept.

"One marketing concept basic to the industry is providing a service railroads are best fitted to perform—true mass transportation. On this marketing concept the integral or unit train has been born. Today, we are concerned with the application of integral trains to the volume movement of coal, but there is no limit to the potential of commodities which can be applied to this principle and will be transported on the railroads."

Along with optimizing use of locomotives and manpower, Mr. Bertrand pointed out that operating officers must insure full utilization of car equipment which has been engineered to meet the full railroad operating potential. "Car utilization is no longer a minor science left to chance."

The importance of assuring maximum car utilization was pinpointed by W. H. Kendall, Louisville & Nashville president, at the annual Coordinated luncheon. Demands for new types of cars also create financial problems "never before faced by this country's railroads," he said. The transformation in freight cars which began five years ago will, in sheer cost, "far exceed the replacement of steam with diesels." He observed that the increases in revenue from new business have been largely swallowed up by the higher freight equipment costs.

Mr. Kendall believes that cooperative, long-range planning by railroads, equipment suppliers, and heavy traffic industries is urgent. "Specialization feeds on itself," he said, pointing out that there are almost daily demands for exotic new cars and extensive remodeling of existing cars, some only a year or two old. "We definitely need the knowledge and experience of shippers and carbuilders to help us through this precarious period of uncertainty to a more stable period of car development. Long life and dependability are necessary factors for today's e[x]pensive railroad cars."

Even with highly specialized equ[ip]ment and proper rates, there st[ill] remains the problem of service, ca[u]tioned C. A. Love, LMOA preside[nt] and L&N chief mechanical officer. H[e] pointed to the recent resurgence [of] interest in motive-power problems [as] railroads are confronted with replac[e]ment programs. Maximum hors[e]power per unit, electrical or hydrau[lic] transmission, and four- or six-whe[el] trucks are among the factors bei[ng] studied. In addition to basic desig[n], maintenance is extremely importan[t].

"Those in supervisory capacities [in] mechanical departments today are [no] longer foremen; they are manage[rs] and it is now becoming necessary f[or] them to think in terms of econom[ic] justification . . . To a large degre[e] the tremendous burden of prepari[ng] a unit of motive power for a troubl[e-]free trip will fall on these frontli[ne] managers," according to Mr. Love.

These men must constantly thi[nk] as they direct the activities of othe[rs] about the effects of their decisions wi[th] respect to the use of materials, magn[i]tude of repairs, and effective contro[l]. The goal must be "trouble-free, d[e]pendable service resulting in a pro[fit] for their companies. Dependable ser[v]ice," Mr. Love concluded, "will con[]tribute more toward returning bus[i]ness to the railroads than anythin[g] else. In doing this, we can go a lon[g] way toward again making railroads [in] a real growth industry."

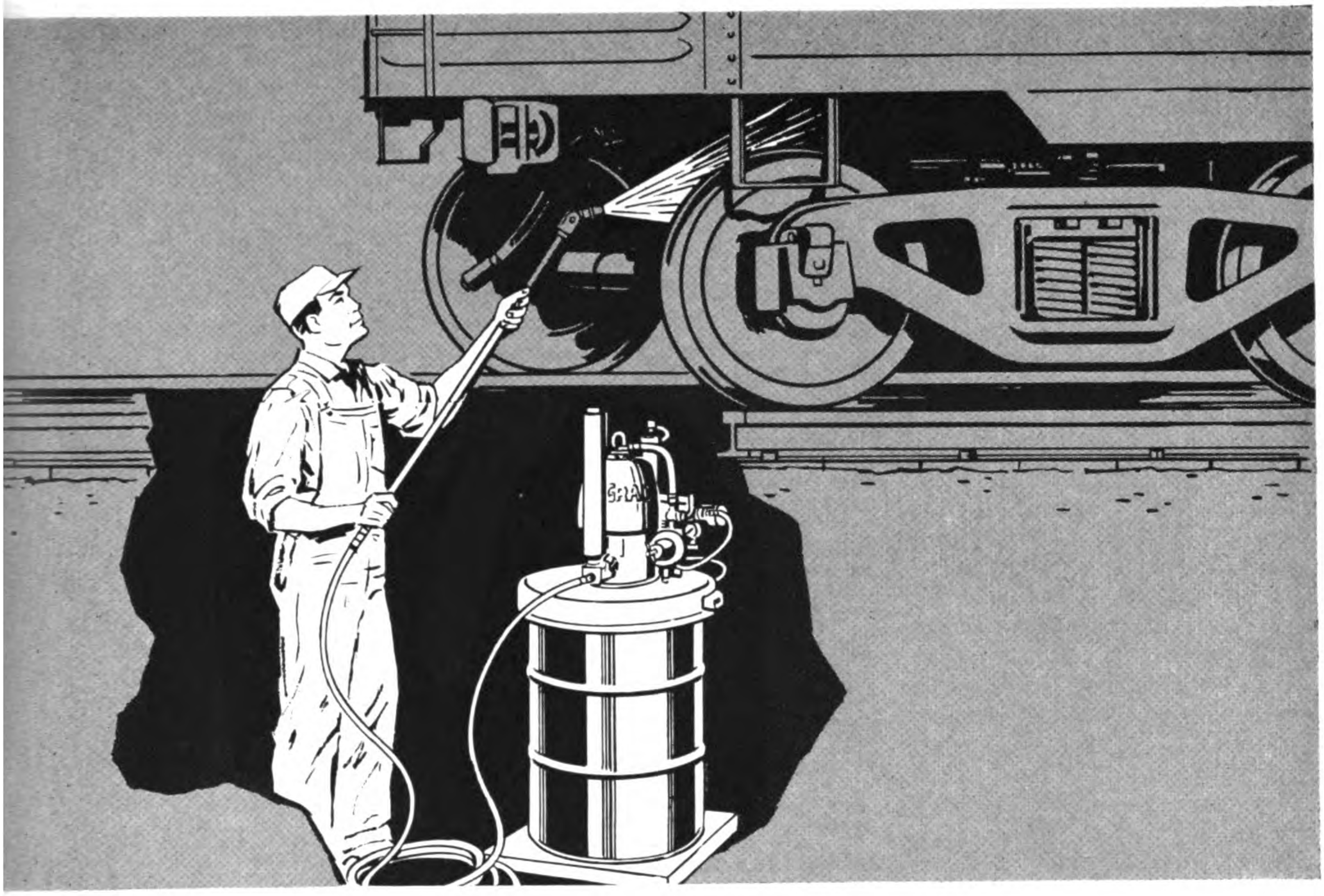
Reports of some of the topics con[]sidered by the Coordinated groups ap[]pear on this and following pages.

One Flange-Tread Contour?

Wheels for freight cars have generally had one flange contour and those for passenger cars and locomotive have another. These dual standards should be eliminated, representatives of the forged-steel and cast-steel wheel industries told last month's meeting of the Car Department Officers Association.

M. S. Reagle, consulting engineer for the American Iron and Steel Institute, pointed out that five years ago 84% of a group of railroads replying to an AAR Mechanical Division questionnaire said that there should be one tread and flange contour for all steel wheels. Since then, many new freight-car-wheel designs have been approve[d], all with the wide-flange contour. "Th[e] selection of the wide-flange was n[o] guess," Mr. Reagle pointed ou[t]. "About 75% of steel freight-ca[r] wheels are removed for flange wea[r] as compared to about 12% for trea[d] wear. Since all steel wheels are con[]demned for $^{15}/_{16}$-in. flange, it make[s] sense to use the wide-flange desig[n] which has twice the metal availab[le] for wear ($^{14}/_{32}$ in. vs. $^{7}/_{32}$ in.)."

Proponents of the narrow-flan[ge] contour used on passenger car an[d] locomotive wheels have pointed ou[t] that a wide-flange wheel could pr[o]duce clearance problems involv[]



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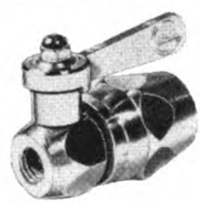

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brake hangers,, gear cases and flange-type brake shoes. Such a wheel might ride roughly when worn to limits.

Mr. Reagle stated that possibly the width of the tread of the wide-flange wheel might be reduced slightly to overcome some of the clearance problems and that restoring of flange and tread contour at regular intervals should insure the riding qualities of passenger cars and locomotives. "Your wheel-shop operations should be simplified with only one tread and flange contour to handle," he concluded.

Among wheel problems currently being investigated are plate failures in one-wear steel wheels (RL&C, July 1963, p 42) and methods for altering wheel-tread contour to increase the area of contact with the rail. This last problem has arisen as car weights have increased, with resultant rail shelling. It was suggested that a slightly hollow tread might me the solution to the high unit stresses which are producing the metal failure in rail heads.

The CDOA Committee on Wheels and Axles called for observance of Wheel and Axle Manual Rule 3C27 and Interchange Rule 80 which prohibit burning holes in wheel plates and permit drilling only if care is taken so as not to produce stress risers. "Some railroads have had major derailments caused by broken steel wheels where cracks started at holes in wheel plates."

H. N. Chastain (left), general assistant, mechanical department, Santa Fe, new president of the Locomotive Maintenance Officers Association, succeeded C. A. Love (right), chief mechanical officer, L&N. Vice presidents of the association are: J. J. Ekin, superintendent special equipment and parts manufacturing, B&O; F. A. Upton, chief mechanical officer, Milwaukee Road; G. M. Beischer, chief mechanical officer, B&O; G. F. Bachman, chief mechanical officer, EJ&E; S. C. Snow, superintendent motive p wer maintenance, L&N. The Railway Fuel and Operating Officers Association elected N. C. Sweetin, road foreman of equipment, Frisco, president to succeed L. H. Leikel, road foreman engines, B&O. Vice presidents of the association are M. A. Davis, chief road foreman, D&H; A. C. Raborn, traveling engineer, IC; J. D. Cockburn, train master and road foreman engines, TH&B; D. J. McGillivray, train master-road foreman engines, CNR.

the Committee warned. "Presumably these holes were made at some wheel shop needing to turn wheels in a lathe not equipped with the proper drive . . . Some railroads are scrapping all steel wheels with holes in the plates regardless of how they were produced or how they are finished."

Several factors, among them improved journal performance, are reducing wheel shop work loads, it was reported.

Satellite Aids Performance

Control of brake equipment is always involved in automating rail operations, J. G. Cannon, Westinghouse Air Brake, told the Air Brake Association. He discussed the entire spectrum from remote control of individual switching locomotives to the completely automated operation of full-length freight trains. "Automation can help railroads operate better schedules more efficiently and with less abuse to equipment, thus providing better service at lower cost," he concluded.

Among the arrangements tested and now available commercially is the "satellite" system in which a remotely controlled locomotive serving as a helper in the middle or at the rear of a long train has its power and braking controlled by radio from the lead or "command" locomotive. The radio equipment on the lead unit transmits only commands. A second transmitter on the satellite unit feeds information to the engineman on the lead unit and indicates control responses.

Brake apparatus on the satellite, arranged to control charging and venting of the brake pipe in harmony with that of the lead locomotive, includes a 26-C brake valve which is of the remote controlled type suitable for use with small safety control equipment and other train control devices. It requires only the addition of a Brake Control Center and Function Selector Network to complete the basic package.

The Brake Control Center and Network will operate brake valve electro-pneumatically to charge and vent the equalizing reservoir, to apply and release the independent brakes, to control the emergency function and late the brake valve in case of gency or loss of radio signal. A car train with a satellite locom and its two points of charge for ing the train line takes less tha the time for pumping off the bra the complete train than would b case when this is all done from a motive on the head end. This is the case for service brake applica and releases and for emergency plications and releases.

Radio transmission from the unit is not continuous. Because necessary to know if communicati possible with the trailing locomo a questioning command is sent odically to the satellite. If the sat receives the command, it responds it did; there will be no further com nication until a fixed time interval elapsed or until a command is iss

While standard 8-point throttle trol is used for power modulation, brake-valve handle is not used for erating the brakes. The brake valv left cut in, performing the ac charging and brake-control functio Its operation, however, is electri being initiated by push-buttons.

The equipment includes five bu tons for controlling brake function The Emergency button produces bot a local pneumatic and a radio-com manded remote venting of the mai brake pipe. If radio is not operatin the pneumatic command would supe sede any other function in operatio of the satellite. The Automatic Brak Application button automatically in tiates a minimum brake-pipe redu tion when depressed once. This redu tion is maintained. Punching the bu ton again will cause the brake pipe be reduced in proportion to the tin interval the button is held down so th large or small brake applications ca be made. Punching the Release bu ton will automatically release brake The two remaining buttons apply an release the independent brake. Ope ation of the Release button, in add tion to releasing an independent a plication, will also release an aut matic application both on comman satellite locomotives.

The satellite will accept instructio from the lead locomotive, see that th are executed, and acknowledge the completion to the lead locomotive. terrain prevents the satellite from r ceiving the radio signal, the lead loc

(Continued on page 36)

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motive will repeat its command until acknowledgment is made. Failure to acknowledge either commands or the periodic questioning transmissions will produce a "loss of communication" signal on the command locomotive. The operator will be in control of the locomotive even though the equipment may be operating within a tunnel which would prevent normal radio transmission.

The equipment produces better operation of heavier, longer, faster trains. Use of brake and power together make possible reductions in slack action. A long train can be made to respond in much the same manner as a short train. Train braking approaching that achieved with the satellite can be produced by coupling a braking car equipped with an engine-drive compressor and brake valve in the middle of a long train. This system has also been tested; gives good results.

From this satellite arrangement which allows the engineman to operate a train by pushing buttons for brake function and energizing normal throttle circuits for power functions, the next step has been complete automatic operation. This permits the locomotive to follow a prescribed speed pattern given by wayside indications and to regulate its own speed. Such a system is now in operation on a line which handles regular interchange freight cars (RL&C, May 1963, p 23).

E. W. Morris (left), engineer car equipment, CPR, new president of the Car Department Officers Association, succeeded C. W. Kimball (right), chief of car inspection, Southern. Vice presidents of the association are: G. J. Flanagan, general mechanical superintendent-car, NYC; D. C. Graves, vice president, Union Tank Car Co.; J. R. Douglass, assistant chief mechanical officer-equipment, L&N.

High Power: Its Problems

Maintenance of higher horsepower locomotives was considered by all committees of the Locomotive Maintenance Officers Association. The group headed by L. M. Allison, master mechanic, St. Louis-San Francisco, presented a general discussion of the subject. Many of the suggestions made by the Committee are incorporated in the proposals made by the AAR Mechanical Division panel that discussed the ideal locomotive, reported on page 26 of this issue.

Acknowledging that higher-horsepower locomotives are a valuable tool in reducing railroad budgets, the committee said that replacement units acquired now will have to be operated and maintained for 15 years. Therefore, "it is our responsibility to encourage the builders by any means possible to manufacture locomotives now that will serve our purpose during the life of the locomotives."

Accurate cost figures for motive power are essential for two reasons: to pinpoint the most costly units for replacement priority and to serve as basic data for justification of replacement buying.

The new higher-horsepower engines do not appear to require anything different in the way of new lubricating oil or fuel. This was the opinion expressed by the committee led by C. A. Wilson, general supervisor diesel engines, Santa Fe. The engines do, however, require better laboratory control to insure cleanliness both in lube oil and fuel. Use of only lubricating oils that have passed builders' qualifications tests was recommended. Reporting on an investigation of ashless detergent lubricating oils, the committee said promising results are being obtained. It appears these oils will be satisfactory for the higher-horsepower engines.

Included in the report was a table giving significant values for metals found in diesel crankcase oil in parts per million. These were average values obtained from a number of railroads and are a guide in predicting trouble.

Full-flow lube-oil filters are necessary in the new engines. The builders are using larger filter bowls with at least seven elements, either with a combination of pleated paper and waste or all-pleated paper. Filter-bowl by-pass valve setting is increased 40 psi. For EMD turbocharger lu oil filters, the committee believes t a throw-away type filter using pleat paper elements is desirable. Use of paper elements eliminates the do and difficulty in cleaning metal-scr elements.

The new engines are equipped w lubricating oil strainers that are ob lete in the committee's opinion. improved strainer can be obtained t will give longer engine protection a lower maintenance costs. This strai has a fluted configuration moun between two perforated sheet-m shells.

For fuel oils, the report listed recommendations of the builders fuel specifications and for fuel-oil fi changes. Fuel injection equipm continues to be a prime source of gine troubles, according to the co mittee on engine maintenance. Un the leadership of G. W. Niemey mechanical superintendent, Misso Pacific, the committee used pho micrographs in its study of nozzles determine why fuel delivery chan and why injector calibrations m prior to installation are not sustai in service. These indicated poor qu ty control in materials and workm ship. Railroads are using test equ ment to calibrate injectors, group them on the basis of fuel delivery get a balanced performance from power assemblies in any one engine

To maintain higher horsepower comotives, no basic changes in sh equipment are foreseen by the co mittee under the chairmanship of J Schroeder, assistant general super tendent motive power, Burlington assumes that component repair wo will remain constant even though t number of locomotive units is reduc

Weights and dimensions of the 5,000-hp class locomotives will quire careful study of lifting equ ment already being utilized to capacity in many shops. These des weigh close to 250 tons and are proximately 88 ft long. Trucks we as much as 40 tons and are 28 ft length.

Load testing, somewhat neglect for older units, assumes new impo tance in the latest models. The co mittee believes load test stands ample capacity must be installed an used regularly. One road uses a p ble load test stand having two c plete dynamic brake grid hatc salvaged from obsolete units. Mo

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Friction Gear for 24⅝ inch pockets; 3¼ inch travel. A.A.R. Certificate No. 35 (A.A.R. Specifications M901-53).

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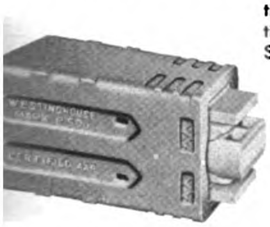

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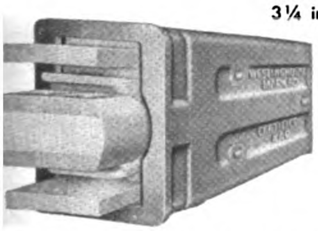
A.A.R. Certificate No. 42; also met A.A.R. Specification M901E-59. Combination friction-rubber, for 24⅝ inch pockets; 3¼ inches travel.



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TWO Mark Gears end-to-end back of each coupler! DOUBLE capacity, double protection for car, underframe device and lading. Use combinations of Mark 50-80, Mark R500-80, Mark 80-80; reaction force remains less than 500,000 pounds. A.A.R. Approved.

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on rubber tires, it can be moved to the locomotive, avoiding the movement of units to specific tracks for load testing. Such a tester may be satisfactory, the committee said, until more expensive equipment can be justified.

A governor test stand must be available because precise setting of the latest governors cannot be performed on the engine. Existing test stands can be modified for adjusting the so-called rebalancing type of governor. It requires an accurately controlled compressed-air source, and the committee suggested use of a 60-in. mercury manometer to measure air input. Some existing drive motors are inadequate, and one with proper torque and speed characteristics must be installed.

A new portable machine for milling truck pedestal jaws is giving excellent results. The committee noted that the more accurate jaw alignment by this machine increased liner, box and wheel performance, cut shop costs in half in comparison with hand grinding.

Cleaning of hood-type locomotives is becoming more important as they are acquired in greater numbers. The committee believes that, eventually, a satisfactory job can be done through the use of a spray system without the need for power brushes.

One successful installation has spray stands applying acid-type materials, followed at a 28-ft interval by an alkaline-solution spray and then by high-pressure (285 psi) water rinse 30 ft beyond. Other installations getting good results use rinse pressures up to 800 psi.

Removing deposits from beneath piston crowns has been successfully solved by blasting. This job is particularly important to obtain maximum cooling of pistons with the higher temperatures encountered in high-horsepower engines. The committee suggests the use of conveyors and automatic cleaning for this piston cleaning operation.

A custom-built conveyor arrangement to remove sludge from cleaning vats eliminates manual cleaning and permits keeping solutions at desired strength by addition of less cleaning agents. Some installations were reported fully amortized after only a single year's operation.

Speeding Terminal Work

Preblocking of cuts to aid in setting out cars at industries and for making prompt transfer moves in interchange can be a big factor in reducing yard and terminal delays. However, such preblocking may create problems in train handling. These and other topics concerned with reducing yard and terminal costs were explored by a panel before members of the Railway Fuel and Operating Officers Association.

An operating officer emphasized that everyone works for the whole railroad and not just one department, so that when, for example, trains are preblocked the problem of handling must be solved because of the resulting economies to the yard and terminal operations. One road's trainmaster reported break-in-two problems resulting from trains having blocks of heavy loads, such as ore, at the rear of the train. The solution, according to one road foreman of engines, is to use cycle braking which, he said, is to apply and release the brakes on a definite cycle so as to take care of slack action. He reported that his road had switched from dynamic braking because the cycle braking method had reduced or practically eliminated break-in-twos and resultant train delays.

Loose wheel or broken flange detectors put money in the bank, a car foreman said in commenting on the advantages of such devices. These, plus hotbox detectors, he said, are automatic detection devices that pro[vide] information in advance without a co[n]siderable drain on manpower. H[e] stated that his road makes exten[sive] use of hotbox detectors in appro[aches] to yards. They are located about [...] to 25 miles prior to each yard, w[ith] the recording tape being produced [in] the car department office at the ya[rd]. He said that carmen often find tro[u]bles on journals that would not ha[ve] been found by normal visual or oth[er] inspection methods. The heavier lo[ad]ing of cars, he stated, has produ[ced] such failures as brasses failing to se[at] properly, and lubricator pads in par[tial] or complete collapse, either of whi[ch] causes journals to overheat.

C. W. Parker (left), chief mechanical engineer, CPR, new president of the Air Brake Association, succeeded J. H. Russell (right) superintendent air brakes and steam heat equipment, NYC. Vice presidents of the association are: R. I. Kendall, general supervisor air brakes and train control, B&M; D. E. Whitney, general air brake supervisor, GN; J. W. White chief air brake supervisor, PRR.

Compared to line-of-road detec[tors] where a 12 mm deflection is consi[d]ered sufficient to warrant stopping [the] train for an inspection, one road's c[ar]men check a journal if its deflection [is] three times the average deflections [of] the car or of the train.

Hotbox detectors also receiv[ed] praise from another road foreman wh[o] said that detectors had pinpointed h[ot] suspension bearings on locomotiv[es] and loose wheels on cars. These dete[c]tors have also been credited with de[]tecting hot journals on passeng[er] trains, although they are not speci[fi]cally used for that purpose, an ope[r]ating officer commented.

How much delay to trains is char[ged] because of the air test? One termi[nal] superintendent said that a record [is] kept on a minute-to-minute basis w[ith] such details timed as when trai[n is] made up, engine is on, oilers on, test made, and train departs. Ano[ther] road's operating officer reported [a] typical time for air test is two cars [a] minute. His road uses five men to [con]nect the air hoses on a train. T[hey] use yard air to make the brake t[est] if the locomotive has not coupled [on] when they are ready for the test. Fo[r] a 90 car train, 45 minutes would b[e] allowed from the time charging begi[ns] until after the air test is made. An[y] time required over the 45 minutes, fo[r] this example, would be charged to th[e] mechanical department. At one trans[]fer yard, ground air is used to pum[p] up the cars, so that the transfer engin[e] only pumps up the caboose. The eng[i]neer then makes a set and release o[f] the brakes, and usually departs in [...] minutes.

One road's car foreman who is i[n] charge of a production-line rip tra[ck] asked "if we are sending to the r[ip] track many cars which could just [...]

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well be repaired in the train yard?" In some instances, he reported, cars which could be repaired in the train yard would make their outbound trains.

As to car distribution, he said there is a need for a greater information flow between car distributors and car foreman or inspectors. For example, the inspectors in a yard are in an excellent position to know the conditions and classes of the empty cars available, thus they might well be in a better position to know locations of cars for shippers' needs than the car distributor who does assign them.

Improving Journal Performance

Further improvement in the performance of the solid-bearing journal assembly involves four separate approaches the Car Department Officers Association was told by its Committee on Car Lubrication. These are:

- Strict adherence to AAR standard requirements and recommended practices;
- Stabilization of the journal assembly;
- Sealing of front and rear of box;
- Detection of journal assemblies which are, or will be, overheating.

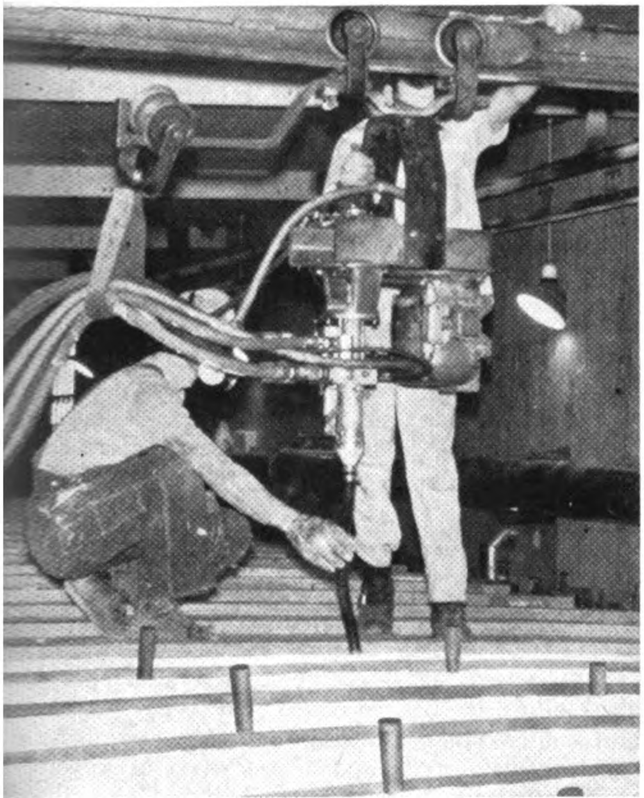
The Committee reported that the present solid-bearing performance—in the million-miles-per-setoff range—has been the result of improvements in journal finish, adoption of controlled size bearings; reduction in wedge radius from 70 to 50 in.; elimination of cast-iron wheels with their tendency to develop rough tread surfaces, and elimination of loose packing with its tendency to develop waste grabs.

Damage to pads continues to impair their performance. The Committee reported that packing hooks frequently cause this. End collars which are rough, sharp, rusty or nicked can damage pad ends while at the s time destroying the oil film on bearing which not only further d ages the pad, but leads to overheat

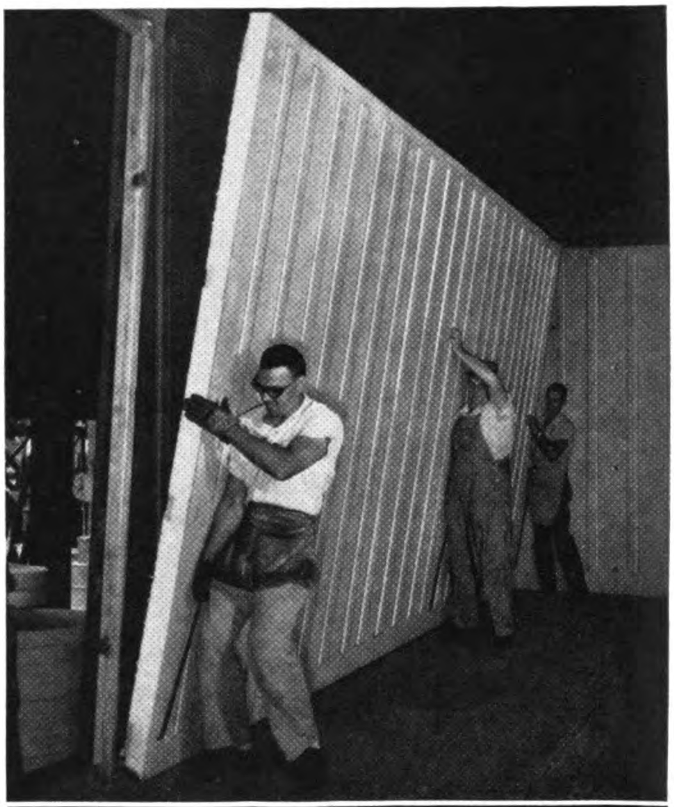
Truck maintenance has only rec ly been recognized as an impor factor in the performance of the so bearing journal assembly. "As p formance improves, it is necessary more serious attention to be given trucks if a better hotbox record is be obtained," the Committee warn

Worn pedestal guides in truck si frames not only cause uneven wei distribution, but can deliver hea lateral thrust to bearings. Spri broken or too weak to carry loads also transmit dynamic forces produ by normal rail irregularities into bearing assembly with damaging sults. Broken or weak body bolst and tight side bearings can also p duce high thrust by restricting f truck swiveling. Dry center pla which also restrict free truck mo ment and are being given attention the AAR Mechanical Division a AAR Research Center, can also ca undue bearing wear. Contributing

wo ways to gain ıp to 1,000 cu. ft. f added payload space in reefer cars



1 (Chicago, Burlington & Quincy)
Use fast urethane foam-in-place methods to gain speed and economy;



2 (Atchison, Topeka & Santa Fe)
Use prefab rigid urethane foam panels to save time, space and money.

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Rigid urethane foam's superior insulating ficiency means lower cost, less material.

Structurally strong, self-bonding, rigid ethane permits 50% thinner walls for added ıyload space, lighter over-all weight.

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Most important, urethane insulation eliminates problems of moisture penetration, freezing, thawing, shrinkage, shake-down, evaporation and cold air leaks that can quickly add up to heavy losses in operating revenue and maintenance expense.

For helpful case history information on how urethane foam insulation is improving performance and saving money for manufacturers and users of reefer cars and vans, write Mobay Chemical Company, Code RL-1, Pittsburgh 5, Pennsylvania.

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the dry center-plate problem is the longer life of steel wheels and reduced number of wheel sets removed for journal damage as bearing-assembly performance improves. The lengthening of intervals between truck removals cuts the number of opportunities for lubricating center plates.

Some method of stabilization, whether it be a separate device or a feature of the bearing itself, must be adopted, the Committee said. "As more experience is obtained [with the two different systems], the most practical and economical solution to stabilization can be made."

Higher mileages per setoff and extension of the present 30-month repack period depend on better box sealing, according to the Committee. Not only would dirt and moisture be excluded from the box, the oil loss could be reduced. The present plywood back guard, costing 22 cents, is seen by some of the Committee "as a waste of money," being "slightly" effective for only a limited time after installation. Any design of rear seal should have a life equivalent to that of the tread of the wrought-steel wheel, something which is not possible without journal stabilization.

Canadian National investigations have shown that the condition of the front of the box and its lid are important to prevent the deposit of snow and dirt inside, even when lid seals are used. "Close attention should be paid to the mouth of the box to assure it is flat and smooth and that sharp corners are removed so that they do not cut into lid seals," it was reported. "Generally, any box which has some kind of lid seal is found to be very clean, rarely showing signs of snow and water in the box." The ordinary box lid without a seal can do a fairly good job of excluding snow and dirt if the box is flat and square, if the lid is not twisted, and if there is plenty of lid spring tension.

As the number of hot-box detectors increases, there should be a further improvement in journal performance, the Committee reported. They are effective not only in detecting complete failures, but in pinpointing cars that have journals which are performing only marginally.

W. M. Keller, AAR vice president-research, agreed with the Committee recommendations that sealing and stabilization are important in achieving further improvement in journal performance. He also said that journal finish must receive further attention and that improved heat transfer in the box is something which must be considered. Performance double that of the million-miles-per-setoff achieved through the first seven months of 1963 is possible, he said. It is important to achieve this since the railroads no longer have the facilities for setting cars off and the competitive pressures no longer can tolerate delays to trains and individual cars.

M. A. Pinney, PRR engineer of tests, said that assuring movement between the top of the bearing and wedge has not received the attention it should and is being studied by solid-bearing manufacturers. Mr. Pinney, who is chairman of the AAR Mechanical Division Committee on Lubrication, said that 40,000 cars with new and renovated pads in "unstabilized" boxes are now on experimental 36-month repack period, and that his group has already recommended 36 months for new pads. H. W. Hayward, assistant chief motive power and rolling stock, reported that the Cana Pacific is now machining the back steeple-back and flat-back bea and lubricating them to produce b performance. He said that collar has been reduced drastically. He reported that the lid seal is not the solution to excluding snow from j nal boxes—that a rear seal is needed.

F. Peronto, AAR executive chairman, said that the research gram for improving journal perfo ance is coming to an end and mem roads have readily approved stand which this research has develo The situation on complying with standards is "not too healthy." Peronto warned, saying that roads are not carrying their fair s in assuring good journal performa even though they now have avail means for doing such a job. If the not more universal compliance AAR specifications and interch rule requirements, the Mechanical vision may have to take steps to that overall journal performance tinues to improve.

Liberalize Piston Travel?

Serious consideration should be given to extending the present piston travel limits of 7 to 9 in. to at least 6 to 10 in. That is the conclusion of the Montreal Air Brake Club in its study, "A Reappraisal of Piston Travel Limits," which was presented to the Air Brake Association by C. C. Maynard, supervisor air brakes and steam heat, Canadian National.

A series of breakaway tests with a 50-ton hopper, made by the engineering department of Westinghouse Air Brake Co. on the Pennsylvania in July 1963 (RL&C, Sept. 1963, p 26), provided the club with data for appraising the effects of long and short piston travel on the stopping capability of a single car, loaded and empty. Test results, the Club reported, show clearly that braking effectiveness is not appreciably greater when operating with short piston travel, nor is it seriously impaired in the long-travel range.

Piston travel is more of a factor in service than in emergency applications. Service braking tests indicate that stopping distance changes by about 5% for each 1-in. change in piston travel.

Actual stopping distances ar available for emergency braking reproduce emergency applicat values of brake-cylinder pressure responding to various piston lengths were obtained by charging standing car to 70 psi through a sing car test device. The piston travel adjusted to approximately the desi length, and the resulting brake-cyl der pressure was shown on a test gau tapped into the pressure head of brake cylinder. Results show relati little change in cylinder pressure piston travel. At 5-in. travel, the pr sure is only 1.6 psi (2.6%) great than that at 7 in. At 12-in. trav is 2.4 psi (3.9%) less than at 9 in.

When safety is the paramount con sideration in stopping a train, emergency braking that is used rath than service braking. The Montr Club concluded that, within practi limits, neither safety nor operati effectiveness would be significa handicapped by extension of pis travel limits. The impaired brake p formance resulting from shor long piston travel has been exag rated, it was reported.

Car Design

(Continued from page 27)

The only specification previously approaching the new proposal in scope was that adopted in 1925 for a single sheathed, truss-frame box car which did include design procedures and calculations. It was never updated and has long been obsolete.

Sections of the new Fundamentals will be:

- Administrative provisions. Purpose and scope of the specification are outlined and the procedures for securing AAR sanction for cars of untried types are outlined.
- General Data. Design data considered essential is indicated and terms are defined.
- Materials. Carbuilding materials and their characteristics are outlined.
- Design. Five sections include (1) loads and forces (specified as dead loads, live loads, lift-truck wheel loads, roof loads, longitudinal forces, impact end forces, lateral forces and other factors needed in calculating car structures); (2) allowable stresses and methods of stress analysis; (3) details of design; (4) load-carrying members; (5) fabrication and construction.

There will also be an appendix which will include the equipment clearance diagrams, the properties of materials discussed in Part 3; examples of stress analysis calculations; derivations of tables and graphs; examples of complete stress analysis of several typical cars.

Mechanical Division members have recently approved a new Equipment Outline Plate C to supplement the previous standard Plate B which will be part of the Fundamentals which permits interchange cars 10 ft [illegible] wide and 15 ft 6 in. high to enable railroads to build longer cars without narrowing them—changes needed to encourage heavy loading. The Manual of Standard and Recommended practice will have to undergo numerous other changes:

- Section C dealing with the vertical center of gravity of cars and with horizontal and vertical curvature on which they are to be operated is to be revised. Most important is the change from the present 84 in. limit center of gravity above the rail to a new [illegible] limit.
- Section D which specifies the limiting dimensions of car trucks.
- Section E which specifies the design of braking systems.

cars will be going into service with more than 2,700 conventional Center Flow cars which are now operating or on order.

ʌore Volume in Center Flow HC Car

eater length and a departure from : original "pear shape" cross-section ıke it possible to incorporate capaci- s of more than 5,000 cu ft in ACF nter Flow dry-bulk cars. The new nter Flow HC (High Cube) cars ll be built in sizes ranging from ;00 to more than 5,000 cu ft.

Developed and tested by the Ameri- ı Car and Foundry Division, the w design is aimed specifically at v-density ladings, including grains, ıstics and chemicals. "Addition of : new series enables ACF to offer lk - materials - handling cars in ca- cities ranging from 2,300 to more ın 5,000 cu ft," F. H. Boland, ACF :e president and division manager, d in announcing the new line.

Modification of the original Center ɔw design to produce the new HC r has involved widening at the top d at the bottom. "The increase in rrying capacity of the Center Flow ıs accomplished by revising the car increase the cross-sectional area thout sacrificing a single important vantage of the original pear-shape sign," Mr. Boland said.

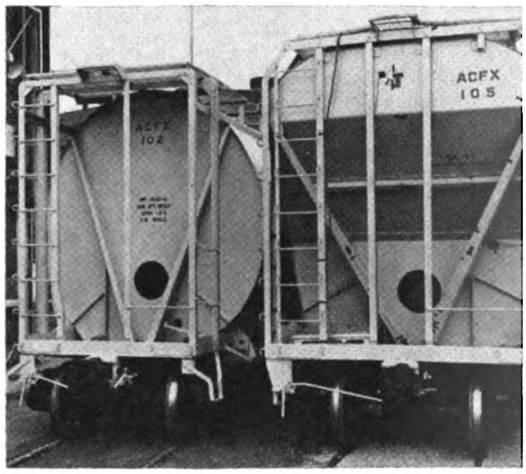
First Center Flow HC car to go into oduction will have a capacity of ;50 cu ft and a light weight of ap- oximately 65,000 lb. With 6½-in. 12-in. axles permitting a total rail ıd of 263,000 lb, the payload will be almost 100 tons in this car.

In developing the HC, ACF has been guided by the proposed car-design criteria now under study by the AAR Mechanical Division. The prototype car's configuration was also built to meet the clearance limits of the new Plate "C" for high-capacity cars just approved by a letter ballot of AAR member roads.

The car is 41 ft 3 in. between truck centers, 51 ft 2¼ in. over strikers. Its cross-section conforms to the new Plate "C" limits with a maximum of 15 ft 6 in. and a width of 10 ft 6 in.

A prototype Center Flow HC, built at ACF's Huntington, W. Va., plant, has been put through rigorous tests. The empty car was subjected to a static squeeze of 1,050,000 lb. Impact tests conducted at the company's St. Charles, Mo., Technical Center, produced coupler forces of up to 1,500,000 lb. Dynamic squeeze tests were performed at speeds up to 12.5 mph, during which forces of 1,450,000 lb were developed with couplers offset 2 in. vertically. All were completed without producing any failures in structural members or welds.

The major advantages claimed for the HC car are its smooth and unobstructed interior, light weight, fast unloading, ability to carry a variety of materials without contamination in its separate compartments, and high cubic capacity. The HC car, like the original Center Flow, also utilizes only stub-end center sills, leaving the major part of the underbody unobstructed and permitting center-line location of unloading outlets.



Limits of newly approved AAR car outline are utilized fully by HC model (right) spotted beside standard Center Flow (left).

On the basis of field research, the unloading outlets have been made 13 x 42 in., 18 in. wider than the outlets in the original Center Flow design. ACF research established these dimensions as the optimum outlet size compatible with existing receiver facilities and for between-the-rails unloading.

J. J. Dwyer

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Choosing Spark Arrestors

Where can a spark arrestor be obtained, or how can one be designed and built which is superior to those currently in service?

There are many different types of spark arrestors on the market. Numerous homemade spark arrestors have been applied to locomotives. Many of these do a good job — but they need regular maintenance and can be very ineffective, even harmful, if not properly maintained. The Cyclone spark arrestor makes a very good exhaust manifold. It will control sparking and will require very little maintenance, except when removed for engine overhaul.

The condition in which an engine is maintained is an important factor with the spark arrestor manifold. Faulty injectors, cracked pistons, and broken valves will load exhaust manifolds with carbon formations so that it becomes necessary to remove and clean them. When the engine is in proper working order, the Cyclone spark arrestor manifold will perform well.

K. Pruchnicki, supervisor locomotive maintenance, Southern Pacific.

Handling Radiator Hatches

Furnish plans for a radiator hatch-turning device for the testing and working of diesel engine radiators on the floor.

"Turning device" can be interpreted to mean a device for handling roof sections in a safe manner during repair and inspection. The device illustrated has proved satisfactory for several years. It is simple to construct and is fully portable so that it can be moved to any shop area. The roof section mounted on this rig is easily accessible for washing, cleaning, rewiring, removal and application of radiator sections, and for testing. The device consists of two pushcarts with the angle irons welded on each for supporting the roof hatch. Steps are located at each end to give easy and convenient access to the top of the roof.

C. V. Kalkbrenner, mechanical foreman, St. Louis Southwestern.

Handling device developed by Cotton Belt can be moved through shop on its flanged wheels.

Lengthening Truck Life

What is the solution to difficulti experienced in obtaining targ shopping mileages on major truc components—center castings, bo and pedestal liners, and ride co trol features?

When trucks are overhauled com pletely, the center castings and bo and pedestal liners should be rebuilt minimum clearances. This would i volve a complete dismantling of truck components.

Dismantling would include remov of bolster, swing hangers, ellipt springs, coil springs, wheels, motor and journal boxes. These componen should then be cleaned, checked a rebuilt to minimum clearances. Whe trucks are reconditioned in this wa they will last the full life of the whee from new flange and tread to the wea limits for both, when the wheel w be scrapped.

If a shop is equipped with a whee truing machine, treads and flanges ca be worked intermittently when wea begins to show instead of waiting un they reach condemning limits. If th shop is not equipped with such a m achine, wheels must be removed to b turned even though trucks need no a tention.

The majority of the railroads ave age three years' life for wheels—fro new to scrap. If properly lubricated regular intervals, trucks which hav been completely overhauled and r built to minimum clearances shoul average three years' service, matchin the wheel life before it would again b necessary to overhaul and rebu them to minimum clearances.

If, instead of being completely ove hauled, trucks are partially rebuilt clearances are just within maximu limits, then a railroad will be contin ally working on them and the labo costs will be excessive; the unit o which they are installed will be out o service frequently. Many railroa maintain spare trucks that can b placed under units as needed, allow ing these units to be returned to ser ice in a couple of hours. The truck removed are completely overhaule and made ready as spares for the ne unit requiring wheel change.

K. Pruchnicki, supervisor locomo tive maintenance, Southern Pacific.

&N Hoppers

(Continued from page 23)

The outside of sides and ends of r receive a primer coat followed r two coats of orange finishing paint. he bottom and underframe receive ıe coat of primer and one coat of eight-car finishing paint.

The L&N has established a 14-sta- ɔn assembly line in its shop for pro- ıction of these cars. Work per- ırmed at the stations:

Station 1. Place draft sill, header ıd intermediate sills on jig and weld, ırning frame to complete welding.

Station 2. After placing on dum- ıy trucks sill is inverted. Apply gear- ıotor supports, transverse shaft, orm gears, fulcrum bracket.

Station 3. Apply shafts, pillow locks, door stops, lever arms, gear- ıotor, crossridge bottom cover plate. 'urn frame upright and apply pipe lamps, piping, bolster cover plate, reb sheet, diagonal side braces.

Station 4. Apply crossridge side reb assembly, diagonal side brace, ɔngitudinal hood supports, and AB alve support.

Station 5. Apply longitudinal ıoods, center doors, floor support gus- ets, center crossridge floors. Start ap- ılication of electrical conduit and ıoxes.

Station 6. Apply crossridge, floor- heet support. Weld crossridge floor heet, bottom end floor sheets, and loor-sheet stiffener.

Station 7. Apply end sill, corner :astings, diagonal braces, corner posts, op floor sheets, floor-sheet braces, :enter bulkhead. Hang outside doors. Weld center bulkhead.

Station 8. Apply all end posts, ıand brake, floor-sheet stiffener at :enter. Burn holes in side connec- :ions. Bolt bottom section using high- strength bolts.

Station 9. Apply reservoir sup- port, reservoir, AB valve, retaining- valve bracket, sheave-wheel support, brake levers.

Station 10. Apply ladders, ladder handholds, sill steps. Weld floor sheets to sides.

Station 11. Spot weld stainless- steel floor. Apply hand brake, hand- brake step and trucks.

Station 12. Ream all holes. Apply high-strength bolts and rivet car.

Station 13. Test brakes and make final inspection.

Station 14. Prime and paint car.

Report *(Continued from page 5)*

change in the minimum of 18 months' service for installations of the lubricator on at least 3,000 interchange cars. This proposition, the Mechanical Division says, should result in greater use of the more efficient designs of journal lubricators and result in improved performance on all railroads.

The revision of Specification M-910A-62, Renovated Journal Lubricator Procedure, includes a new Section 8 which permits an individual pad to be renovated only once. Lubricators which have been renovated once shall not be renovated again and applied to cars in general interchange service. This permits initial installation of lubricators to operate for at least 30 months, after which they would be removed, renovated and applied for another 30 months. There would be a total life of 60 months except where individual lubricators might be removed for wheel changes. Both specification changes were recommended by the Committee on Lubrication of Cars and Locomotives.

Changes in the Manual and Interchange Rules affecting high-capacity cars were recommended by the Committee on Freight- and passenger-Car Construction and have been approved by letter ballot:

- A new Equipment Plate "C" in the Manual covers cars 15 ft 6 in. high, 10 ft 8 in. wide, with inside length of 55 ft 9 in., which will clear over 95% of total mileage of member roads but will be specified ' limited interchange service."
- A new Plate "C-1" to be used v "C" which graphically shows the maxim width of cars allowed with various tr centers. The graph is based on a 13- curve—441 ft 8⅜ in. radius with a car h ing truck centers of 46 ft 3 in. and m mum width of 10 ft 8 in. With these tr centers, the maximum swingout is 7¼
- Revision of Present Equipment. Pl "B," changing its title to read "for ur stricted interchange service," and add the following: "All new or rebuilt c should be so designed that no part of car shall be less than 2¾ in. above the of the running rail under all allowable w and spring deflection conditions. Roads ing multiple-wear wheels may find it nec sary, in maintaining the 2¾-in. minim clearance, to compensate for wheels w close to the condemning limit by replac wheel and axle sets, bearings or wedges."
- Modify Interchange Rule 3 with n Paragraph 1 in Section C reading: "((1) Clearances. In cases where a road c not handle cars built to the maximum mensions of the equipment diagram 'C' o all its lines, it must report this condition the Secretary of the Mechanical Divisi so that its name can be listed on Plate C the AAR Supplement to the Manual. must also include in its clearance limi tion tables in the publication "Railway Li Clearance" a note outlining all of the stricted areas on its lines which cann handle such cars.

In addition to the above three items a proved by the special letter ballot, the M chanical Division has announced that regular letter ballot covering items recom mended at the limited business session June has also been completed. All 55 item many of which were discussed in the mee ing report (RL&C, July 1963, p 38) we approved.

Economic Census Will Cover Railroad and Builder Shops

Activities of facilities operated by railroad and commercial firms for the building an rebuilding of cars and locomotives a scheduled to be surveyed by the Burea of Census early next year. The Census Business, Manufactures and Mineral In dustries, covering practically all comme cial activities in the U. S. and conducted b mail at five-year intervals, will require r ports for the year 1963. Rail equipme manufacturers and wholesalers, and th shops of operating railroads will recei specialized questionnaires covering such d tail as location, type of ownership, dol volume, payroll, and the number, dolla value and weight of rolling-stock units pr duced and repaired.

In addition to their use in guiding d cisions in business and Government, th Economic Censuses have recorded th growth of the Nation's industrial and bu iness economy for a century and a h All firms are required to report, und terms of the Census Act, which also pr vides that information concerning an i dividual firm must be kept confidential an may be used only for statistical purpos

Manufacturers in the rail equipment i dustry will receive Form MC-37E label

l Transportation Equipment." Typical e products for which quantity and value b. plant) figures are asked include service, road switching and switching locomotives (diesel-electric, diesel-ıanical, electric storage battery); re- locomotives; new and rebuilt passen-rain cars and freight-train cars. For specific category of locomotive, pas-er-train car and freight-train car, re-dents are asked to include the unit ht in short tons.

ıops of operating railroads will receive n MC-37EX entitled "Locomotives and Built and Rebuilt in Shops of Oper-; Railroads." Product information will lentical to that called for on Form MC- Manufacturers' sales branches and offices in the railroad equipment in-ry will receive Form CB-51K entitled ınsportation Equipment." Total sales)63 will be asked.

---

ders and Inquiries New Equipment

ed Since Closing of October Issue

omotive Orders

NON.—*Alco:* 9 2,750-hp Century 628 diesel ıotives. Cost, $2.3 million. For delivery early 64.

ght-Car Orders

RON, CANTON & YOUNGSTOWN.—*Pullman-lard:* 150 50-ft roller-bearing box cars ped with 9-ft sliding doors and 6-ft plug . Cost, $1.9 million. Delivery expected early ınuary.

LANTIC COAST LINE.—*Pullman-Standard:* 186 n cushioned underframe box cars. *General rican:* 15 Airslide covered hoppers. *Company ı:* 25 70-ton lumber cars. Deliveries of these oller-bearing equipped cars to begin in De-er.

RFOLK & WESTERN.—*Company shops:* 1,500 n hopper cars. Cost, over $15.5 million. The to be known as Class H-11a, are a modified on of the 85-ton roller-bearing hopper pre-ly built by the N&W. Production to begin December 1.

A EXPRESS.—*General American:* 13 85-ft -back cars for TOFC service. On lease.

LINE.—*Pullman-Standard:* 10 85-ft flat cars OFC service.

BASH.—*ACF:* 100 4,000-cu-ft capacity Center covered hoppers. Estimated cost, $1.4. For ery before end of 1963.

es and Inquiries

ngor & Aroostook directors have approved urchase of 100 large mechanical refrigerator at a cost of approximately $3 million.

ie-Lackawanna freight-car repair program at lville, Pa., shops to include 1,000 box cars and gondolas. Program, costing about $3 mil-calls for turning out 15 to 18 cars per day.

nesee & Wyoming inquiring for 200 100-ton er cars with MacGregor sliding roofs.

and Trunk Western will install Freight-er cushioning devices in 21 existing 50-ft, n box cars for use in hauling automobile ı.

uisville & Nashville, through its $38 million ment program for 1964, will purchase 1,250 -top hoppers, 400 covered hoppers, and 125 ıead flat cars. The capacity of 2,500 open-top ers will be increased from 50 to 60 tons and box cars will be rebuilt at the road's South sville shops.

ssouri Pacific will order, as part of a $100 on modernization program, 400 100-ton Cen-low bulk materials handling cars; 200 100-ton inum covered bulk materials handling cars; 100-ton hoppers; 100 100-ton gondolas; 200 -ft, 90-ton box cars; 100 60-ft, 70-ton me-ical refrigerator cars; 100 70-ton flat cars; 100 cars, and 50 insulated, 50-ft, 70-ton box cars.

ıion Pacific will order 2,000 freight cars of ous types and 55 5,000-hp diesel-electric loco-ves during 1964.

Personal Mention

CORRECTION

Burlington.—*Chicago:* ROBERT E. TAYLOR, whose appointment as chief mechanical officer was announced in the July issue, is a graduate of the University of Nebraska (BSME-1943). He entered the service of the Burlington in August 1946, serving successively as general pattern inspector, mechanical inspector, assistant mechanical engineer, mechanical engineer, and engineer of equipment until his appointment as chief mechanical officer. The sketch which accompanied the photograph of Mr. Taylor in our August issue, page 52, is not the career of Mr. Taylor, but that of J. D. Rezner whom Mr. Taylor succeeded.

Atlantic Coast Line. — *Jacksonville, Fla.:* JOHN W. HAWTHORNE, chief mechanical officer, appointed assistant vice president in charge of equipment.

Mr. Hawthorne, a graduate of Purdue University (BSME 1933), began his career with the New York Air Brake Co., later becoming air brake instructor, Chesapeake & Ohio, at Richmond, Va.; assistant superintendent motive power, and superintendent motive power, Central of Georgia; assistant chief of motive power and equipment, general superintendent motive power and equipment, and chief mechanical officer, ACL. He is past chairman of the AAR Mechanical Division, a past president of the Locomotive Maintenance Officers Association, a past president of the Southern and Southwestern Railway Club, and a member of the ASME.

Canadian National.—*Moncton, N.B.:* W. W. WYNNE appointed assistant general superintendent of equipment, Atlantic Region. Formerly superintendent of equipment, Rideau Area. *Belleville, Ont.:* K. E. HUNT appointed manager, Rideau Area. Formerly general superintendent of equipment, St. Lawrence Region, Montreal. *Montreal, Que.:* C. R. BATTLEY, general foreman, Point St. Charles diesel shop, now supervisor of motive power, St. Lawrence Region. *Toronto, Ont.:* ROBERT A. ROBINSON appointed supervisor of car equipment, succeeding R. HARVEY, retired. Mr. Robinson formerly general foreman-car, Mimico, Ont.

J. W. Hawthorne
ACL

W. E. Lehr
LV

Detroit, Toledo & Ironton.—*Dearborn, Mich:* JOHN E. CHUBB appointed president, succeeding DAVID E. SMUCKER, named vice president-operations, Pennsylvania. Mr. Chubb formerly regional manager, Northern region, Pennsylvania, at Buffalo, N.Y. A. C. ROBINSON, superintendent locomotive department, appointed superintendent mechanical engineering.

Erie-Lackawanna.—*Youngstown, Ohio:* J. D. RENTZ, appointed master mechanic. Formerly supervisor car repairs, Western district, Meadville, Pa. *Jersey City, N.J.:* M. J. FEDORKA appointed master mechanic. Formerly supervisor car repairs, Eastern district, Susquehanna, Pa. *Marion, Ohio:* A. R. STRAWSER appointed master mechanic.

Florida East Coast.—*St. Augustine, Fla.:* J. L. CALLAWAY appointed mechanical engineer; S. D. SMITH, superintendent diesel maintenance; S. R. BAKER and J. M. WHITE, JR., general diesel foremen, and L. S. WILLIAMS, general foreman.

Lehigh Valley.—*Sayre, Pa.:* W. E. LEHR, superintendent motive power, appointed chief mechanical officer. C. C. TREESE, assistant superintendent motive power-car, appointed superintendent car equipment. C. P. TURNER, system supervisor diesel operations and maintenance, named superintendent locomotive equipment. E. J. PACE appointed general car inspector.

Mr. Lehr, chief mechanical officer, entered railroad service with the Baltimore & Ohio in May 1918. He subsequently became a special apprentice and later h various supervisory positions until Janu 1943. He then entered the employ of Lehigh Valley, with whom he has ser successively as master mechanic, supe tendent of shops at Sayre, Pa., and, si April 1947, superintendent motive po

Louisville & Nashville. — *Mobile, A* WILLIAM C. MARLETTE appointed ma mechanic, M.N.O. & P. division, succeed JESSE B. QUIGGINS, retired. *Corbin, K* HOWARD MCINTYRE appointed master m chanic, succeeding Mr. Marlette.

Milwaukee. — *Milwaukee, Wis.:* M. BENZER, assistant engineer of tests, pointed chief engineer of tests, Milwau shops, succeeding H. H. MELZER, now sistant chief purchasing officer at Chica J. J. DRINKA, assistant to chief mechan officer, appointed assistant chief mecha cal officer.

New York Central. — *New York:* W. MOLLOY appointed assistant supervisor maintenance-freight. ROBERT M. BLOO FIELD named production control analys

Northern Pacific. — *St. Paul, Minn.:* L. EARL appointed master mechanic, St. Pa and Fargo divisions, succeeding C. WIRTH, retired. *Livingston, Mont.:* O. HETHERINGTON appointed master m chanic, Rocky Mountain division, succee ing Mr. Earl. K. R. ANDERSON appoint assistant master mechanic, succeeding M Hetherington. Mr. Anderson formerly rou foreman of engines at Duluth, Minn.

Ontario Northland.—*North Bay, Ont.:* H. DUQUETTE appointed general foreman, su ceeding T. READ, retired. G. H. BROWNLE appointed backshop foreman, succeedi Mr. Duquette. J. C. NICHOLSON appointe machine shop foreman, succeeding M Brownlee. C. A. STRAIN appointed assist foreman, succeeding Mr. Nicholson. *En glehart, Ont.:* V. F. JACKSON appointed a sistant foreman, succeeding Mr. Strain.

Pennsylvania. — *Conway, Pa.:* R. J. SAT appointed assistant foreman, Conway e ginehouse. *Philadelphia, Pa.:* HERBERT MILLER appointed master mechanic. *P burgh, Pa.:* PAUL F. HOERATH appo master mechanic, succeeding Mr. Miller

Supply Trade

NERAL AMERICAN TRANSPORTION CORP.—*John E. Angst* elected a ector and named vice president in charge the Freight Car Division. Mr. Angst, had been general manager of the ight Car Division, succeeds *Herman schul,* who, in his retirement, will conle to serve as a consultant to the divi-ı.

UGH EQUIPMENT CO. — *A. E. aefer,* formerly of the Engineering Detment, assigned duties of the new posiı of manager of purchasing for all ugh products.

IITCAST CORP.—*Floyd R. Brown,* extive vice president, elected president, ceeding *Joseph L. Tillman,* now retired l chairman of the board of directors.

TIONAL CASTINGS CO.—*Mellor W. venson* elected to newly created office of -president-marketing. *Lawrence G. ckmon* appointed vice president and ieral manager, Transportation Products rision, succeeding Mr. Stevenson. *Edrd O. Spahr* appointed vice president and ieral manager, Capitol Foundry, Div., ceeding Mr. Blackmon. *Carlisle R. ter* appointed works manager, Melrose rk, Ill., plant, succeeding Mr. Spahr. Mr. ter formerly in charge of engineering,

J. E. Angst
General American

F. R. Brown
Unicast

L. G. Blackmon
National Castings

G. G. Tenney
National Castings

Transportation Products Div. *Glenn G. Tenney* appointed general manager of sales, TPD, continuing to supervise activities of the Chicago sales office.

FREIGHTMASTER DIVISION, HALLIBURTON CO.—*Tom W. Painter* elected vice-president. *C. H. Bartlett,* service engineer, appointed sales engineer at Fort Worth, Tex.

VAPOR CORP.—*Kenneth H. Grim* named sales manager, Industrial Division.

UNITED SHOE MACHINERY CORP.—*Herbert W. Jarvis,* manager of USM affiliates and divisions serving industries other than shoe manufacturers, named also a vice president of the corporation.

FARR CO.—*George J. Golden* appointed manager of newly opened branch office at 5423 West Belmont ave., Chicago.

ELECTRIC STORAGE BATTERY CO.—*Herbert H. Warren,* Northeast regional manager, Exide Industrial Marketing Div., retired.

HUCK MANUFACTURING CO. — *Joseph E. McKenna* appointed vice president of marketing, with responsibility for all marketing and sales operations, including expanded field engineering services.

C & D BATTERIES, A DIVISION OF ELTRA CORP: *Leon L. Lentz* appointed to newly created position of manager-railroad sales, Conshohocken, Pa.

AIR-MAZE DIV., ROCKWELL-STANDARD CORP.—Headquarters of *Harold E. Donovan,* railroad sales manager, moved from Chicago to 25000 Miles ave., Cleveland 28.

STRATOFLEX, INC.—*W. G. Jackson* appointed sales engineer at San Francisco, Calif.

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following page 52.)

63. THE MACGREGOR ROOF. Booklet contains a resume of the development of a self-contained one-man-operated full opening roof for freight cars, also line drawings showing the basic design and function of the MacGregor roof. Railroad Supply & Equipment, Inc.

64. MAINTENANCE CLEANING. Manual entitled "Railroad Maintenance Cleaning" covers use of Oakite detergents, specialized compounds and mechanized equipment for cleaning locomotive and passenger cars interiors and exteriors, hot-tank parts, tank cars and refrigerator units, trucks, underframes and running gear, water and oil-cooling systems, roller bearings and journal boxes. Automatic paint stripping and prepaint treatment also discussed. Oakite Products, Inc.

65. HOPPER DOOR LOCK. Bulletin W-100-L contains descriptive data and action photographs on operation of new cam-action full-width single-hopper door lock. Wine Railway Appliance Co.

66. CARBIDE TOOLS. Catalog 64 covers "the most complete selection of [Kennametal] metal-cutting carbide tools, inserts blanks and components ever offere[illegible] Kennametal Inc.

67. FASTENERS. Four-page folder, co[illegible]densed from 20-page catalog, contai[illegible] pertinent information about all of the m[illegible] commonly used M-F lock nuts. Catal[illegible] also available. MacLean-Fogg Lock N[illegible] Co.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Act of October 23, 1962; Section 4369, Title 39, United States Code).

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	Average no. copies each issue during preceding 12 months	Single issue nearest to filing date
A. Total No. copies printed (net press run)	5,342	5,175
B. Paid circulation		
1. To term subscribers by mail, carrier delivery or by other means	4,821	4,558
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C. Free distribution (including samples) by mail, carrier delivery, or by other means	306	416
D. Total No. of copies distributed (Sum of lines B1, B2 and C)	5,127	5,074

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(Signed) Robert G. Lewis, Publisher.

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ILWAY

.ocomotives

nd Cars

DECEMBER 1963

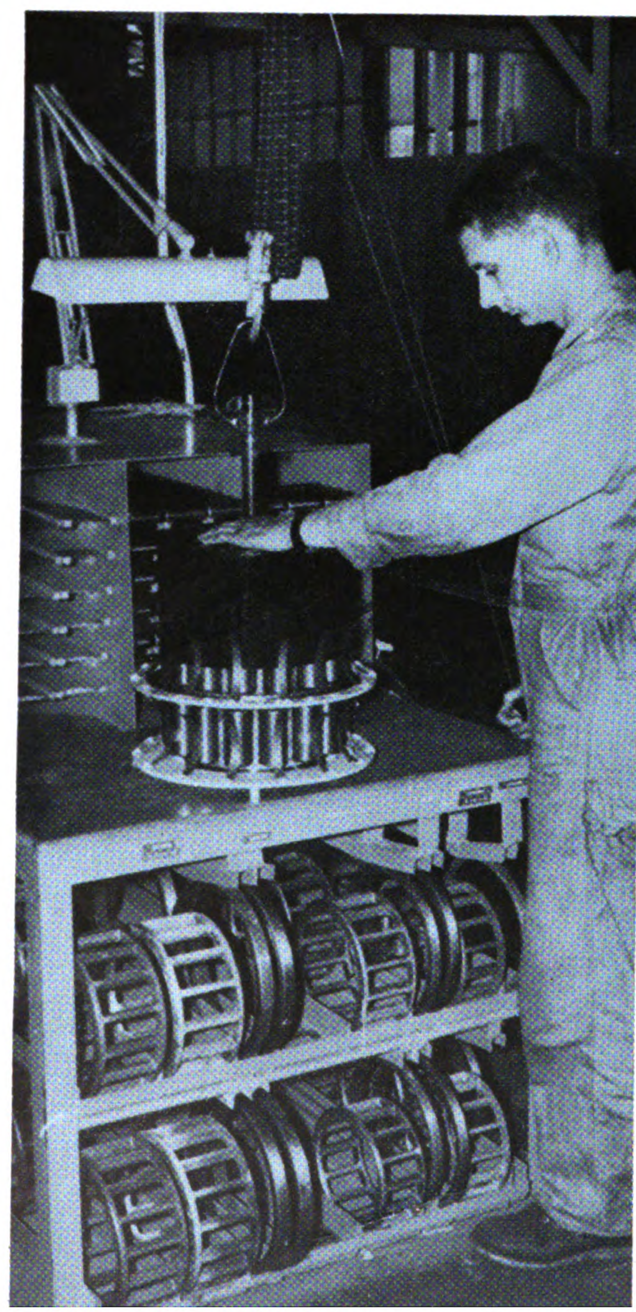
Effects of Heavy Freight Cars on Wheels and Axles Are Discussed by ASME Panel

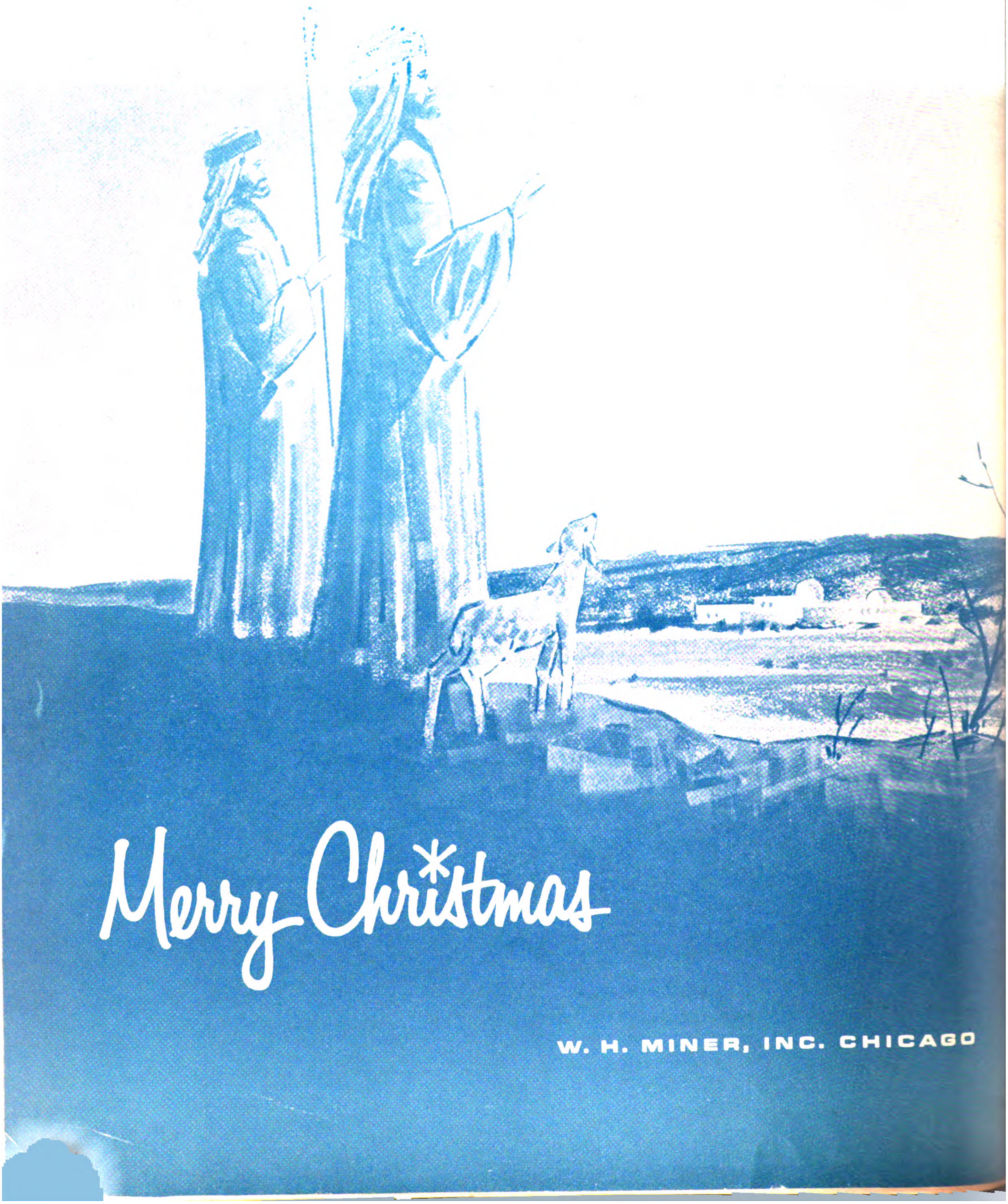
...page 17

A Simmons-Boardman TIME SAVER Publication

SEABOARD BEARING SHOP

page 27

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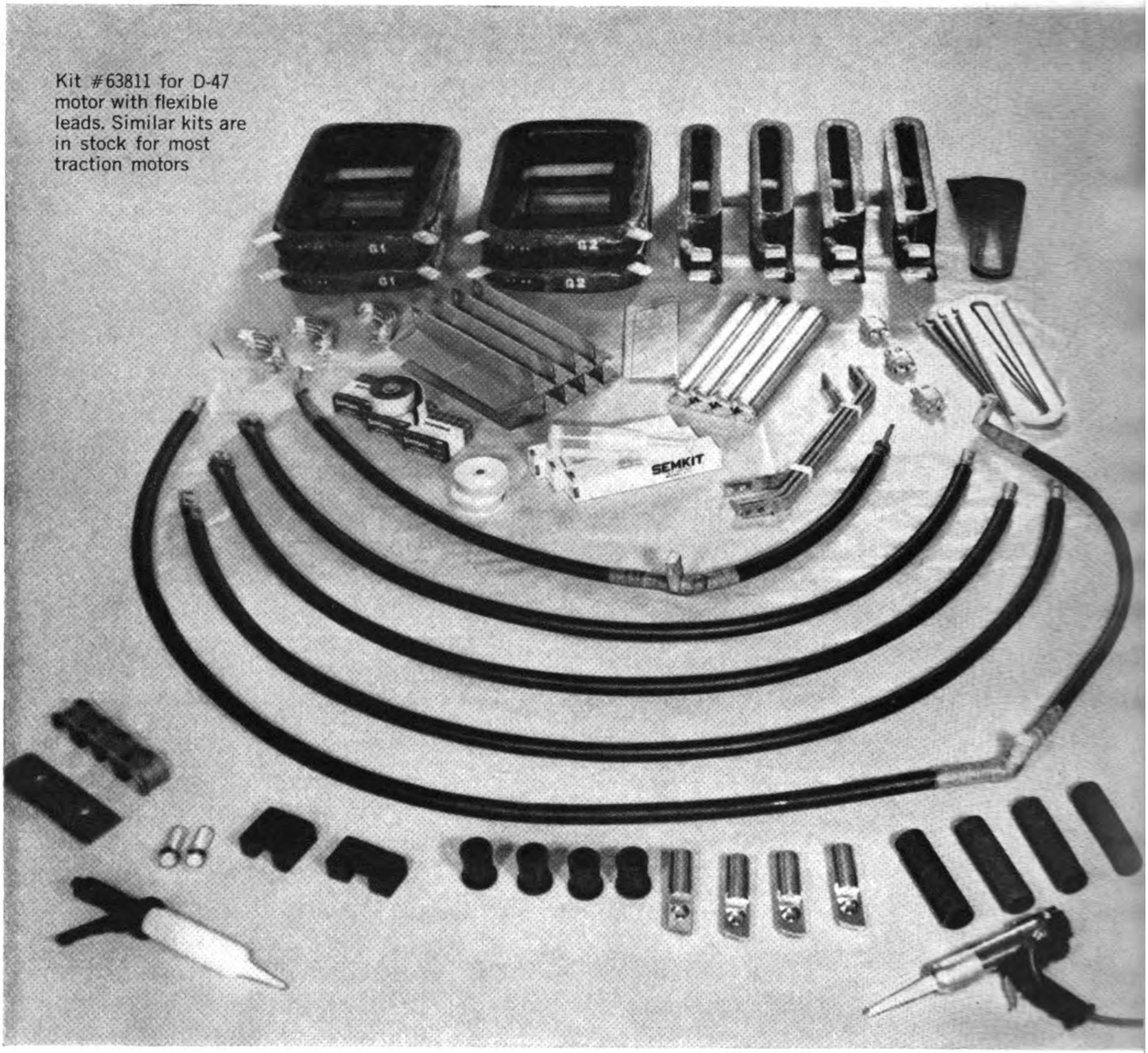

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RAILWAY

Locomotives and Cars

America's Oldest Trade Paper
December, 1963—Vol. 137, No. 12

'IME SAVING IDEAS FOR DECEMBER

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Report

Emphasis on Car Repairs Is Burden to Railroads

Most railroads don't really know exactly what they're paying for freight-car repairs, and, by today's standards, railroads don't belong in the heavy car-repair or carbuilding business, J. W. Hawthorne, assistant vice president equipment of the Atlantic Coast Line, told a recent meeting of the Railway Systems and Management Association in Chicago. He went on to point out that carbuilders and railroads, working together, can design and build cars that will be virtually free of major repairs during their full, useful lives.

"If a competent business man who had never been employed by a railroad were to scrutinize closely almost any facet of the average railroad's freight-car repair program," Mr. Hawthorne stated, "he could only come to the conclusion that the railroad was guilty of poor purchasing policies in buying equipment which would require such repairs in a normal service lifetime, or was attempting to extend the life of obsolete units unduly—and, in either event, was using extremely poor judgment in making such expenditures for repairs to older equipment.

"The outsider would probably be further amazed that an industry established to transport freight would have as a sideline the virtual recsontruction of its transport tool, the freight car." No other transportation mode takes on this job, he said.

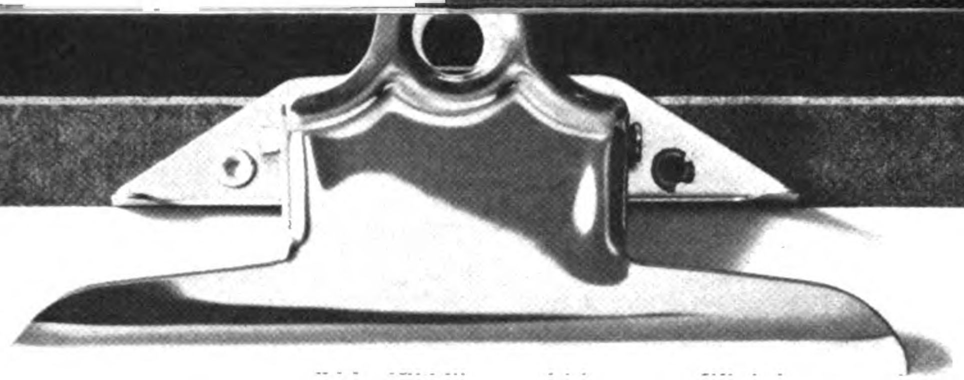
ACL's assistant vice president equipment picked eight roads at random, checked their ICC Account 314 (Freight Car Repairs) reports for 1962 and found the eight spent between 4.5% and 6.8% of total operating revenues for repairs.

"During the early stages of the current per-diem case," he continued, "we turned up a disquieting fact in that none of the railroads checked appeared to be aware of their actual costs on a day-to-day basis for freight-car repairs as divided between running repairs and the more expensive repairs consummated in the heavy-repair shop. Even more disquieting is the fact that apparently none of the roads checked had any idea of the cost involved on a current basis in performing a most common repair."

So far as ACL is concerned, Mr. Hawthorne notes, several criteria come into play when a car reaches a point where it needs more than light repairs:

- "Is the car needed to handle available traffic? If it isn't, it certainly isn't necessary to repair it for continued service, and it should be retired."
- If the car is needed can it be repaired, "is it so obsolete in design, so low in capacity, or so limited in its operational ability as to render it suitable only for limited use? If this is so, the car should not be repaired even if a pressing need arises when literally any car will be acceptable to the shipper as this is short-time and costly emergency work, the need for which should not obtain in well regulated business."

(Continued on page 9)



ONLY ACF FREIGHT-SAVER CUSHIONING

Provides consistently dependable cushioning. Cuts dead weight. Eliminates costly maintenance

	BRAND			
	ACF	X	Y	Z
Free of springs	Yes	No	No	No
Air return	Yes	No	No	No
Self-contained	Yes	No	Yes	No
Metering pin	Yes	No	Yes	Yes
Available in 20″ travel	Yes	Yes	Yes	Yes
Available in 30″ travel	Yes	No	Yes	No
Made, sold, and serviced by same organization	Yes	No	Yes	Yes
True hydraulic	Yes	Yes	Yes	No
Return travel snubbing action	Yes	No	No	No
Adjustable centering force	Yes	No	No	No
Unit weight installed (lbs.)	2200	3700	3000	2400

nages other economies so that the Freight-Saver is as ch as 1,500 lbs. lighter than other center-of-the-car hioning systems.

And, because the ACF Freight-Saver is self-contained l has no need for return springs, it is the easiest tem to install.

ACF Freight-Savers are available with 20 or 30 hes of travel. In either size, they provide reliable tection for an extremely wide range of ladings. In h sizes, ACF Freight-Savers have proven trouble- –impact after impact, year after year. Get the full facts. Write for complete details, Director of Marketing, American Car & Foundry Division, ACF Industries, Inc., 750 Third Avenue, New York 17, N. Y.

AMERICAN CAR AND FOUNDRY
DIVISION
ACF INDUSTRIES

Report (Continued from page 5)

• If a car in the latter group is repaired, "how long will it be serviceable in terms of miles operated or loads handled before either high-cost running repairs will be encountered, long out-of-service periods be experienced, more heavy repairs needed?"

As Mr. Hawthorne sees it, mechanical and transportation-department officers lack cost-control data necessary to effective decisions—and the lack shows up in "such examples as newly repaired cars found daily with broken body bolsters."

A sampling of 500 cars, he notes, was taken earlier this year by the AAR Mechanical Division. All were cars with defects requiring transfer of lading—and the record indicates "an appalling number of structural defects, many of which were literally built into the car through inadequate equipment design."

Purchase of a new car, Mr. Hawthorne declares, "is still the ultimate factor determining the economics of freight-car repairs, [and] it has been our experience, based on the condition of cars passing over the repair tracks, that all too few railroads have freight-equipment purchasing policies which include a careful analysis of the strength and expected life of the new cars' components."

Mr. Hawthorne concluded that railroads should get out of the car-rebuilding business, "eliminating the need for heavy freight-car repairs and leaving car construction to the carbuilders, but only under the most rigid specifications."

Changing Equipment, Methods Require New Skills

To cope with equipment innovations which require "a new breed of railroad craftsman," railroad union leaders are urging their members to participate in skill improvement programs and are seeking management's help with the retraining task.

At a recent meeting of the National Railroad Apprenticeship Conference in Chicago, the problems created by changes in motive power, rolling stock and railroad shops were outlined by J. R. Osman, Rock Island general superintendent of motive power and equipment. In summing up the reason for the unions' concern, he said: "The future is going to bring a need for a smaller number of vastly more skilled master mechanics.... We will need a superior breed of mechanic who will have to be able to grasp the function of the unit he works on."

The trend toward more power from fewer locomotive units and more capacity from fewer cars will continue, Mr. Osman predicted. The result will be a "lesser number of maintenance personnel and facilities." Motive power trends, he added, point to an emphasis on "current running maintenance, rather than heavy shop repairs. The tax schedule encourages early retirement rather than rebuilding."

For labor, Mr. Osman stated, this will require more training through formalized education, classroom instruction, correspondence courses, and the educational facilities of locomotive and car builders, "all supplementing shop work."

As critical as the need for retraining journeymen, in the opinion of union leaders, is the need for more and better apprenticeship programs.

The task of training apprentices and journeymen, NRAC speakers declared, belongs both to management and unions. From management's viewpoint, said Elmer E. Walker, secretary-treasurer of the International Assn. of Machinists, "the day is long past when an industrialist can say 'I won't have a training program, I'll get my skilled craftsmen from other places.'"

Joe Taylor, director of skill improvement, International Brotherhood of Electrical Workers, said the union has set up a skill improvement program with Missouri Pacific, is negotiating for a similar program with Santa Fe, and has established its own formal classroom instruction and do-it-yourself courses for journeymen. The union has had no trouble in luring its members back to the classroom.

Orders and Inquiries for New Equipment

Placed Since Closing of November Issue

'assenger-Car Orders

SANTA FE.—*Budd:* 12 60-ft railway post office ars. For June-August 1964 delivery.

.ocomotive Orders

FRISCO.—*EMD:* 16 2,500-hp diesel-electric locoıotives. Estimated cost, $2,600,000. For delivery ı March and April 1964.

MISSOURI PACIFIC.—*EMD:* 25 2,500-hp diesel-lectric road units; 25 1,200-hp switching units. ost of 50 units about $7,730,000.

reight Car Orders

ATLANTIC COAST LINE.—*Pullman-Standard:* 600 0-ft. 70-ton box cars with 9-ft doors; 400 40-ft, 0-ton box cars. The 1,000 cars will include dam-ge-reducing devices, steel-ribbed nailable compotion floors, and cushioned roller-bearing trucks. pproximate cost, $13 million.

BURLINGTON.—*International Car:* 50 steel caooses. For delivery first quarter 1964.

CHESAPEAKE & OHIO.—*Company shops:* 2,000 Super Eighty" 80-ton hopper cars for coal rvice. $16 million dollar order scheduled for ompletion March 1, 1964. *ACF* and *Pullman-tandard:* 1,000 box cars. Cost, $11 million.

CLINCHFIELD. — *ACF:* 800 70-ton, 3,200-cu-ft-ıpacity hoppers. Estimated cost, $8,750,000. For elivery first quarter 1964.

FRISCO.—*General American:* 100 70-ton insulatl box cars equipped with cushion underframes, ovable bulkheads and roller bearings; 100 70-n non-insulated box cars. *Pullman-Standard:* 00 100-ton, 3,447-cu ft hoppers with roller bearıgs; 100 100-ton 4,427-cu ft covered hoppers with oller bearings. *Thrall:* 100 100-ton, 3,000-cu ft overed hoppers with roller bearings. *Company ops:* 50 70-ton bulkhead flat cars.

GREAT NORTHERN.—*ACF:* 50 100-ton box cars quipped with cushion underframes. For delivery his month.

GULF, MOBILE & OHIO. — *International Car:* 2 abooses for use on coal trains to begin operation ı Illinois next fall.

LOUISVILLE & NASHVILLE.—*Pullman-Standard:* 25 100-ton hopper cars; 425 80-ton hopper cars. ost, approximately $15.5 million. All cars to e equipped with roller bearings. Production to gin this month, with deliveries running Januy-May 1964.

MISSOURI PACIFIC.—*ACF:* 400 100-ton Center low steel covered hopper cars; 100 60-ft box cars. Cost of 500 cars, $7 million). *Bethlehem Steel:* 00 100-ton steel hopper cars ($4,870,000). *Magor ar:* 200 100-ton aluminum cars for handling bulk materials ($3,720,000). *Constructura Nacional de Carros de Ferrocarril (Mexico):* 200 100-ton steel gondola cars ($2,400,000). *General Steel Industries:* 100 70-ton, 60-ft cast-steel flat cars ($1,500,000). *Pacific Car & Fdry.:* 100 70-ton mechanical refrigerator cars ($3 million). *General American:* 50 70-ton, 50-ft, insulated, compartmentized box cars ($882,000).

NORFOLK & WESTERN.—*ACF:* 50 4,000-cu-ft-capacity Center Flow covered hopper cars for transporting soda ash, lime and other chemicals, Cost, over $700,000. Deliveries to begin this month.

NORTHERN PACIFIC.—*Company shops:* 100 50-ft RBL cars; 300 50-ft single-sheath steel box cars; 50 bulkhead flat cars; 175 log flat cars. Order part of a $14,604,350 budget for construction and purchase of new freight cars in 1964.

PACIFIC FRUIT EXPRESS.—*Pacific Car & Fdry.:* 500 50-ft, 70-ton mechanically refrigerated cars equipped with FreightMaster cushioning devices. For delivery in March and April of 1964.

PHILLIPS PETROLEUM CO.—*General American:* 265 32,800-gal-capacity, two-diameter tank cars for hauling liquefied petroleum gas. Cars to have a capacity 2,500 gal greater than capacity of first two diameter cars introduced in 1961. Diameter at each end increased from 99 to 104 in. Diameter of middle section, 118 in. Weight of car decreased by more than 6 tons. Delivery scheduled for completion by March 1964.

Notes and Inquiries

Canadian National is equipping 500 cars with wider doors at its Point St. Charles shops. Conversion program may eventually involve 5,000 cars being equipped with 9-ft doors to meet increased use of such mechanical loading devices as forklift trucks.

Chesapeake & Ohio will spend $91 million on capital improvements in 1964 compared with $71 million in 1963. As part of the 1964 program, directors have approved expenditure of $21 million for 2,000 hopper cars and 20 diesel locomotives. These are in addition to orders for 2,000 hopper cars and 1,000 box cars listed above.

Missouri Pacific, in addition to orders listed above, will order another 200 freight cars later at an estimated cost of $6 million, bringing MP's total 1964 expenditures for locomotives and freight cars to approximately $37 million.

Shop Improvements

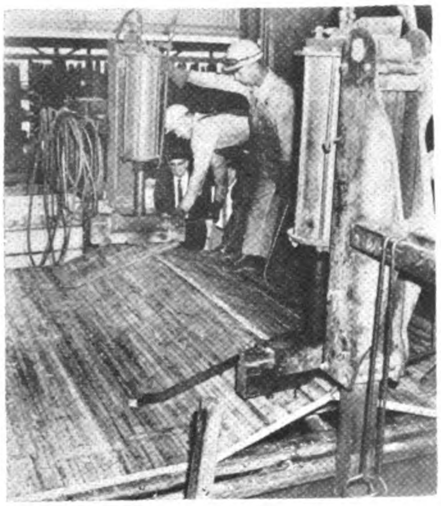
The *Pennsylvania* will spend more than half a million dollars to remodel its Conway Yard enginehouse and set up an assembly line inspection system for diesel locomotives. Project scheduled to be in operation by next April.

First 2,5000-hp GM Units Delivered to ACL

The first General Motors 2,500-hp GP-35 diesel-electric freight locomotives have gone into service on the Atlantic Coast Line. The GP-35, first announced in Chicago last May (RL&C, June 1963, p 53), is the successor to the 2,250-hp GP-30. Redesigned prime mover, electrical transmission and control apparatus are incorporated in the GP-35. The GM two-cycle 567-D3A diesel engine, which runs at 900 rpm as compared with 835 rpm on the earlier 567-D and 567-C models, has newly designed pistons, improved cylinder heads, changes in the turbocharger, and improved engine-air filtration. The all-new electric transmission — D-32 main generator and D-67 traction motors—matches the engine's higher horsepower. Continuous tractive effort is 52,000 lb at 12 mph.

At the delivery of the first unit, R. L. Terrell, vice president of General Motors and general manager of EMD, called attention to the dramatic changes in the diesel locomotive since ACL received its first GM diesel locomotive in 1939 and the first FT freight locomotive in 1944 which was "traded in" on the new GP-35. "Horsepower is virtually doubled—from 1,350 in the 1944 FT to 2,500 in the new GP-35, enabling one GP-35 locomotive to do the work of two FT units," he said.

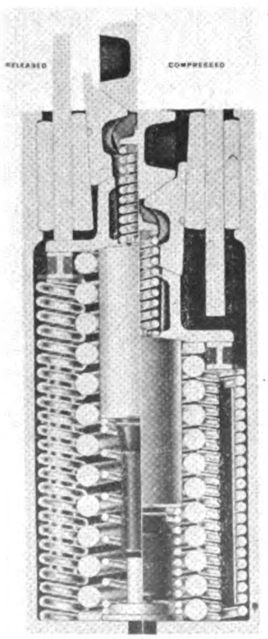
What's New in Equipment



Car Decking

Alger-Deck, a laminated edge grain car decking, is kiln-dried to a moisture content of 12% before it is glued and surfaced to final size. This, it is said, gives a tighter freight-car floor with a tough wearing surface. Waterproof adhesives are used in the lamination. The lumber is also Cellon treated with a chemical which is an odorless and colorless wood preservative. One road is said to have purchased the decking for 300 car sets. Alger-Sullivan Co.

For more information, circle 12-1 on card following page 46.



Draft Gear

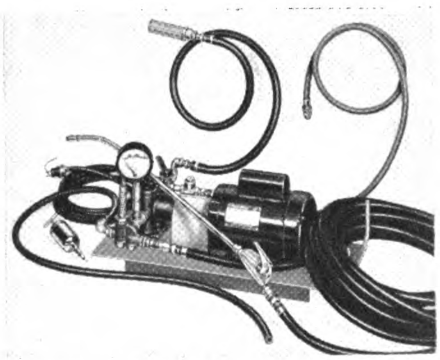
The Mark H-100 hydraulic-friction draft gear utilizes Mark 80 component parts, supplementing coil spring resistance with a velocity-sensitive hydraulic element. At present, it is applicable to the AAR alternate standard 36-in. pocket without modification. The gear is reported to have in excess of 100,000 ft-lb capacity below 500,000 lb reaction force level. AAR approval has been granted for limited application in interchange service. Cardwell-Westinghouse Co.

For more information, circle 12-2 on card following page 46.

Box-Car Cleaner

Fremont 328 box-car cleaner has been field tested and is now used to remove road soil, grease and oil from exteriors of cars. It is said to be fast acting and safe on all coatings. According to manufacturer, chemical consumption is low because of high product concentration. Reduction in labor is said to be approximately 75%. An average total cost, including ½ hr labor, is given as $2.51. Fremont Industries, Inc.

For more information, circle 12-3 on card following page 46.



Spray Cleaning Unit

The Tysol high-pressure spray-cleaning unit, resting on a 55-gal drum, applies pre-mixed solution at pressures from 0 to 500 psi. It has a 1-hp motor, a Hypro positive displacement pump, VeeJet nozzle, and 50 ft of spray hose. Only a 110-volt outlet and standard water supply are needed. The portable, one-man unit, it is said, saves 50 to 70% in cleaning time. Model 500 has a displacement of 2 gpm; Model 501, 3 gpm. Tysol Products.

For more information, circle 12-4 on card following page 46.

Pneumatic Bulkhead

The low-pressure air cushion of the ABC push-button damage-control bulkhead maintains a constant "live" force against lading, holding it firmly as a single mass. If set pressure on lading is relaxed by a fraction of a pound, the bulkhead, which

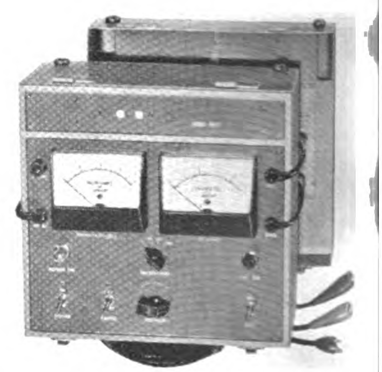
has an expansion range of 1 to 27 in., automatically takes up the slack, eliminating voids. An axle generator operates the compressor which maintains the air-cushioning pressure. Air Bulkhead Car Corp.

For more information, circle 12-5 on card following page 46.

Space Heaters

A line of portable space heaters, in five capacities from 150,000 to 1,000,000 Btu, can be used in storage sheds, and repair shops, and temporary heat can be supplied during repair of a permanent heating system. The heaters can be used for curing sand, or paint, or to preheat equipment, machinery or materials. Heat can also be concentrated on workers in one area. Ingersoll-Rand Co.

For more information, circle 12-6 on card following page 46.



Portable Test Set

The Model 5212 high voltage Hypot is designed for dielectric strength tests and insulation leakage findings at potentials from 0 to 10 KV. Equipment which can be tested

includes motors, servos, cables, wiring, generators and circuit-breakers. The unit detects leakage currents as low as 0.05 microamp. Electronic circuits protect voltmeter and microammeter from damage due to overload. Associated Research, Inc.

For more information, circle 12-7 on card following page 46.

Car Cleaner

The Good Roads scavenger is capable of removing debris from box cars, gondolas and ground spillage in yards and station grounds. The unit, equipped with a 145-hp gasoline engine, develops 11,000 ft/min at the 12-in. hose nozzle. Air suction is adjustable for removing selective trash. Pallet design permits mounting on a truck, rail car or at spot cleaning tracks. The 12 cu-yd hopper tilts 50 deg for gravity dumping. Dust traps are available. John S. Miller Railroad Sales.

For more information, circle 12-8 on card following page 46.

Industrial Battery

The 75TR car-lighting and air-conditioning battery provides a 25% increase in capacity without increasing cube dimensions of batteries commonly used by railroads. Plates per cell range from 9 to 45. The 75TR-21 is rated at 750 amp-hr. A comparable size KAZ-21 battery is rated at 600 amp-hr. Like other G-N batteries, the 75TR has molded hard-rubber monobloc containers and self-closing vent caps. Gould-National Batteries, Inc.

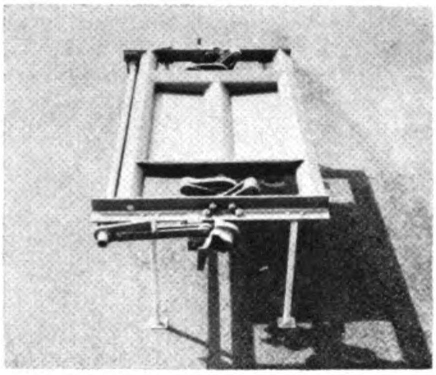
For more information, circle 12-9 on card following page 46.

Welding Wires

The Alpha 25 is a compact, semi-automatic welding wire driver for extra heavy duty applications both with cored and solid wires. It feeds 1/16, 5/64, and 3/32-in. solid wire, and 5/64- and 3/32-, 7/64- and 1/8-in. diameter cored wires. Its air-cooled, pistol-grip gun is rated at 500 amp, 50% duty cycle.

The Uni-Comp T-62 all-purpose cored wire for automatic and semi-automatic welding handles all single and multi-pass applications in flat or horizontal position. It is stocked in 3/32 and 5/63 in. diameters, with special sizes available on order. A. O. Smith Corp.

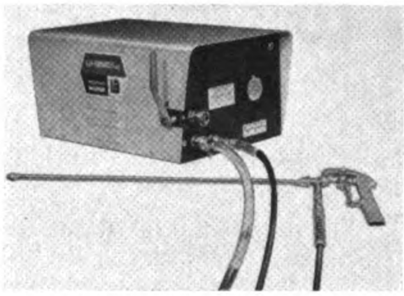
For more information, circle 12-10 on card following page 46.



Discharge Gates

Discharge gates for covered hopper cars are available in two models. The quick-opening outlet (illustrated) is completely self-clearing, with no clutch action involved. The bar cannot hang up in the operating handle. The case can be of steel or stainless steel. In addition, another new model of conventional design involves a rack and pinion operation for quick opening and closing with constant torque. It can be supplied to any dimensions, including sizes for the new large hopper discharge openings. Enterprise Railway Equipment Co.

For more information, circle 12-11 on card following page 46.



Washer Unit

The Model 102 high-pressure washer develops a fine, 500-lb per sq in. spray for washing equipment; for washing passenger and freight loading areas, and for cleanup jobs around railroad installations without the need for scrubbing. No air is needed; it develops its own pressure. The one-man-operated unit has two inlets, each using 2 gal per min. One draws hot or cold water from tap or tank; the other draws cleaning materials. L & A Products, Inc.

For more information, circle 12-12 on card following page 46.

Hydraulic Draft Gear

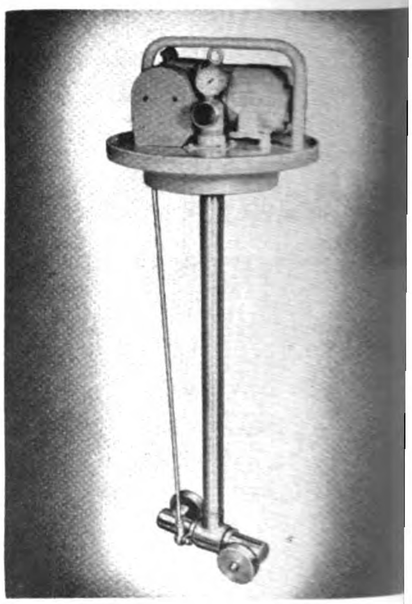
The Hy-Draft hydraulic-mechanical draft gear, completely interchangeable with conventional types, is designed to fit the standard 24⅝-in. pocket. No special tools are required for installation, and it is reported that the gears can be installed at the rate of one car set per hour. Hy-Draft has a total stroke of 6 in.—4 in. in draft; 2 in. in buff. Tests are said to show the device has the capacity to protect the car and lading at speeds up to about 8 mph, at 500,000 lb reaction force. An 18,000-ft mechanical capacity keeps the draft gear working position when train is going up down grade. Due to the double-acting hydraulic arrangement, there is little or recoil even though the high-capacity rubber springs are used to provide the mechanical capacity. The controlled action of the H Draft is said to improve train action because it eliminates the neutral position when going from buff to draft or vice versa. steel used in the gear is high-tensile and hydro-tested. The rubber springs are and ozone-resistant. Exposed working parts are plated for protection against corrosion. Ajax-Consolidated Co.

For more information, circle 12-13 on card following page 46.

Iron Powder Electrode

The Easyarc 7028 (AWS-ASTM classification E6028-E7028) iron-powder electrode is for horizontal fillet and flat position welding of mild steel. It is designed for use on high sulphur, cold-rolled and low-alloy steels, and is operated either with alternating or direct current, reverse polarity. It strikes an arc when hot or cold, and features easy slag removal. It is available in 18-in. lengths and in diameters of 3/16, 7/32 and 1/4 in. Air Reduction Sales Co.

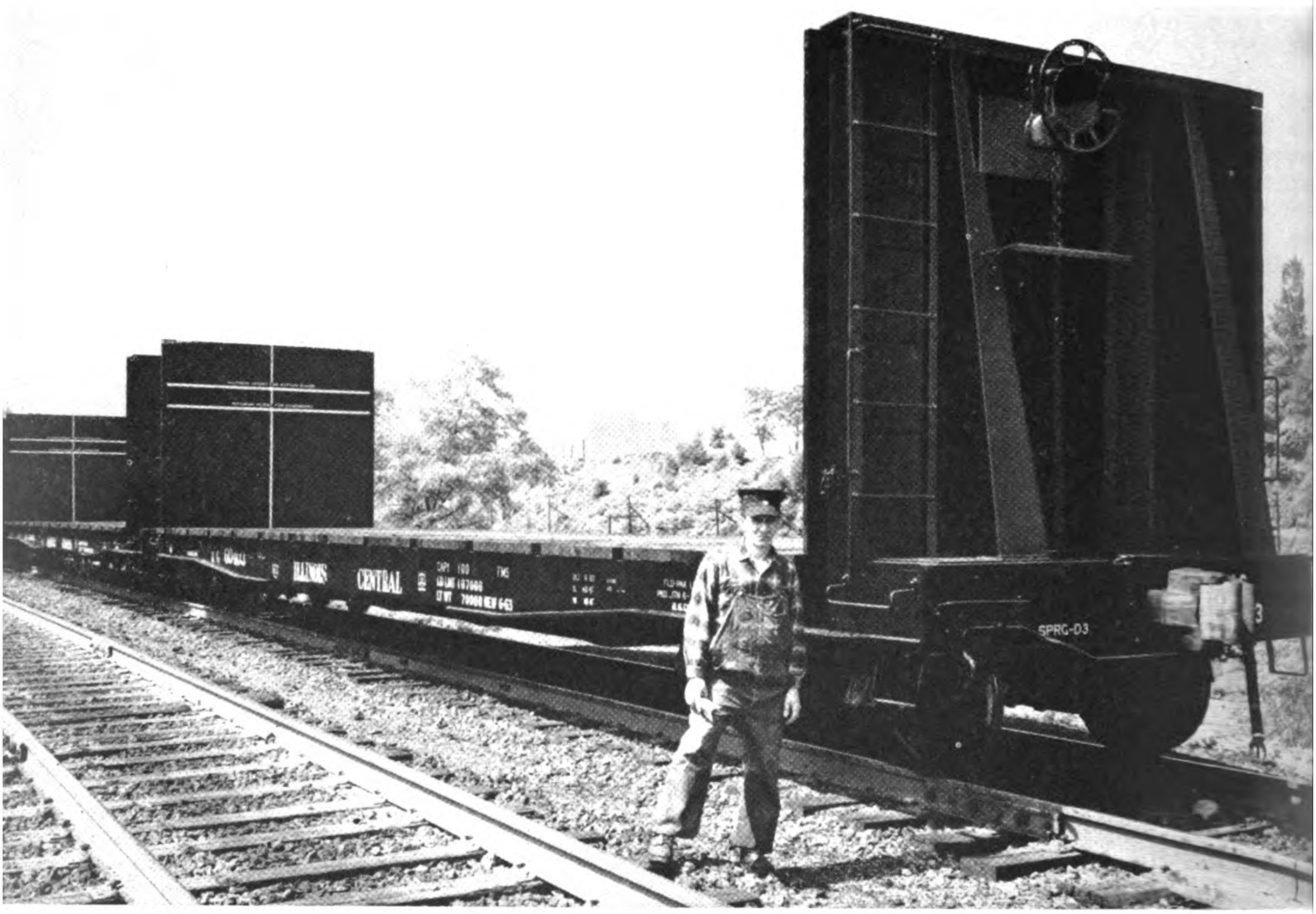
For more information, circle 12-14 on card following page 46.



Tank Washer

The Transport Tank Washer is said to provide complete and thorough cleaning of all interior surfaces of railroad tank cars up to 48-ft in length. Two jet washer discs on a motor-driven head, which oscillate every 20-sec deliver 115 gpm in a fan-like spray at 50-psig. The 58-in. stainless steel unit extends 48-in. into the tank in operating position. Other components include a ½-hp motor and 2-in. dia pipe to carry the cleaning solution. Wyandotte Chemicals Corp.

For more information, circle 12-15 on card following page 46.



Another Success Story for Bulkhead Flat Cars

200 for the ILLINOIS CENTRAL

Here is a special-purpose car that is really catching on. It's Bethlehem's bulkhead flat, shown here ready to leave our Johnstown Car Shops and go to work for the Illinois Central. The full order of 200 cars was completed and delivered to the IC during August, for carrying lumber, bricks, and other building materials.

These cars are similar to the 177 bulkhead flats built by Bethlehem for the D&RGW over the past two years. They are 53½ ft long, and of 50-ton capacity. The special design of these cars takes full advantage of the best features of heavy castings and rolled-steel sections, using each where its particular properties are most efficient and economical.

Bethlehem's tooling, engineering, and quality control equip us to fit right in with the pressing need for highly specialized rolling stock, as well as with standardized designs. Let's get together and discuss your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Steel

Steel for Strength

Editorials

Ɩore in '64

/ith 1963 destined to be the best which car and locomo-ve builders have seen in some time, optimism already ırrounds prospects for 1964. Car orders for 1963 are ҁpected to approach the 50,000 mark, highest since 958. Locomotive orders are expected to total considera-ly more than in 1962.

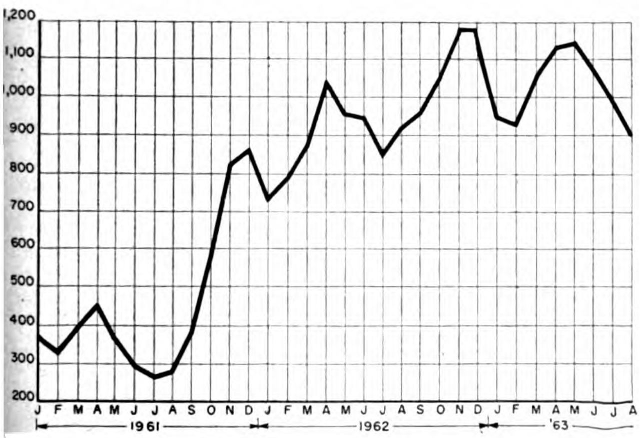
There should be no let-up next year. A recent Railway ‚ge survey has shown that this year's capital expenditures f over $1 billion for all purposes should be topped ap-reciably by capital spending in 1964. In every case, ac-uisitions of motive power and rolling stock loom large in ıilroad plans.

Mechanical departments must be ready for these buy-ıg programs. Transportation capacity is no longer meas-ıed in sheer numbers of units. Individual motive-power nits are expected to haul more and haul it faster. Indi-dual cars are expected to carry more and carry it more :liably. Such service demands place great responsibilities n those who must design, construct and maintain the cars nd locomotives for tomorrow's railroads. Getting "more ı '64" does not merely mean a larger number of diesels r freight cars; it places primary emphasis on the capac-y, availability, marketability and reliability of individual nits. Getting these units must be the primary assignment ›r '64. Mechanical departments should be ready to ıtisfy the demands which will be placed on them.

'oo Many Hotboxes

here is a general agreement that a nationwide average of vo million freight car miles per hotbox can be achieved ith current journal bearing designs and lubrication. Yet ıe trend in July and August, the last two months for which ata are available, has been in the wrong direction to reach ıat goal.

The August mileage of 898, 949 is the lowest since July, 962 with its 855,449 miles per hotbox. In that month,



612 of the 2,923 hotboxes were attributed to "Waste and Others". For August, 1963 only 94 of the 2,977 hotboxes were classified "Waste and Others" which leaves lubri-cating pads without any scapegoat to take the responsibil-ity for the poor showing.

We also note from the August data that most of the large western roads had below average records during the month. In contrast, the large eastern roads were, in gen-eral, above the million mile mark. This situation suggests that regional differences in ambient temperatures may have influenced journal box performance. We doubt that maintenance practices are better in the east than on the more prosperous western roads.

It is probable that lubricating pad performance is ad-versely affected by length of service. For this reason the recent action of the AAR Mechanical Division in limiting pads to one renovation should be of great value in revers-ing the current trend. The division's tightening of lubri-cating pad specifications by changing requirements for conditional approval from 80 to 65 hotbox setouts per 54,000 car months will also help the situation by weeding out the less efficient journal lubricators.

If these measures are not effective in getting the trend moving upward we are sure that even tighter controls will be considered. With present know-how, hotbox perform-ance should be improving; certainly, backsliding should not be tolerated.

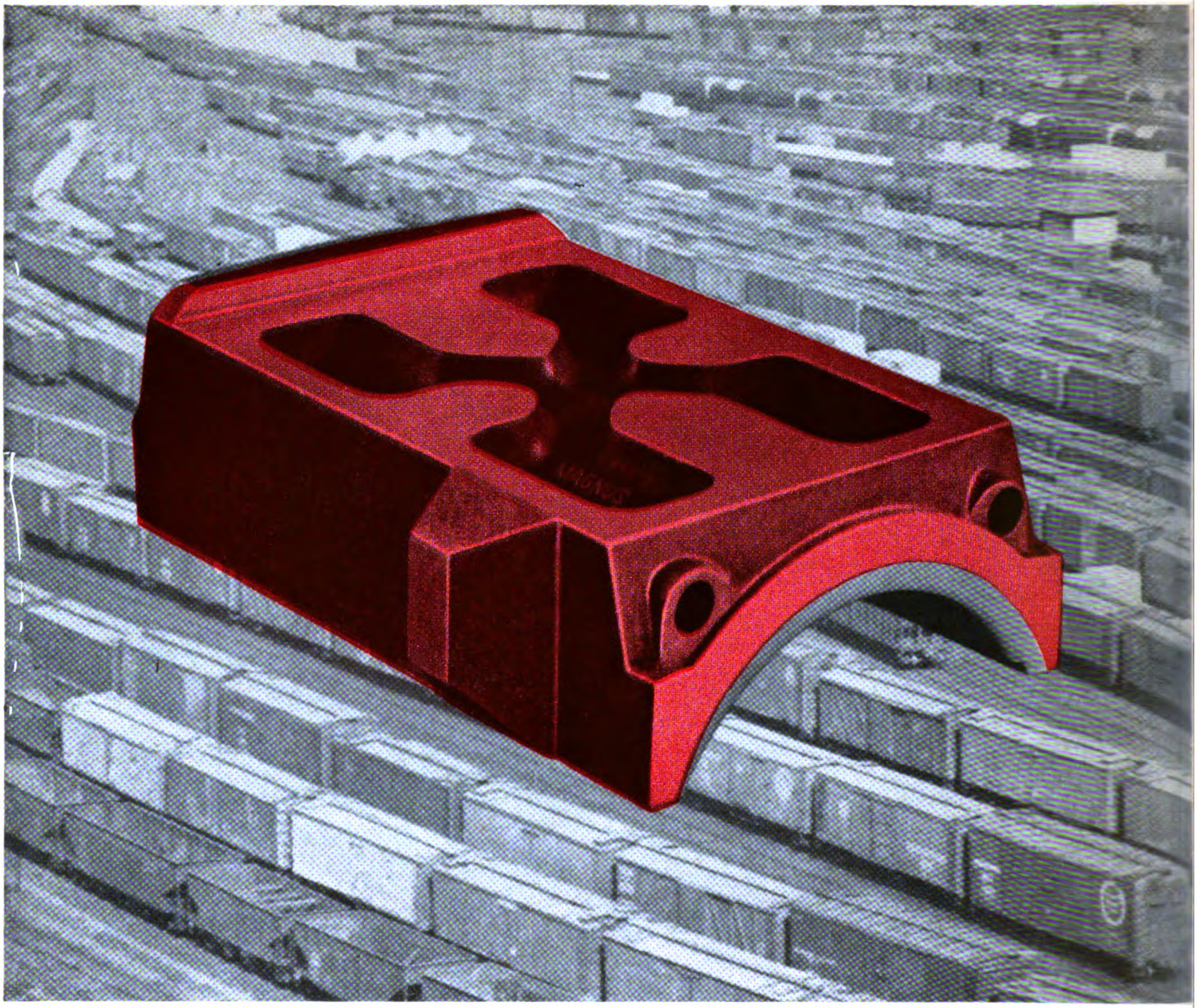
Per Diem Changes

The multi-level per diem rental system for freight cars will go into effect on January 1, 1964. Rumors to the contrary, we have not verified any change in the effective date for the new rates that reflect freight car values.

Instead of a flat $2.88 per car per day the rental charges will vary between $2.16 for a car worth $1,000 or less to $7.74 for a car worth $20,000 or more with "worth" meaning original cost less depreciation. These changes are important. Many railroads have been willing to spend money for higher cost freight cars in captive service. They have been understandably reluctant to spend more for cars in interchange service when no return on the added invest-ment could be realized. There may be slight hitches in putting the new per diem rates into effect but we are sure that any delays will be temporary.

The changes in per diem rates to reflect car values have been advocated for years by many top railroad men as the greatest incentive for the purchase of new rolling stock. In voting for the new rental system about two-thirds were for and about one-third against the new rates. This relatively high negative vote is the reason for questions about the effective date.

The new rental rates will help to speed the construction of cars that will meet the specialized needs of shippers. This equipment has a higher price tag. The new rates will make the added costs more acceptable.



You can DOUBLE present performance with MAGNUS Flat-Back Bearings

All indications point to at least 2,000,000 car miles per set-out with Flat-Backs—longer bearing life too.

Even today you get over 1,000,000 miles per hot box with solid bearings—almost 4 times the performance only 5 years ago. Overall costs for solid bearing operation have gone down, too—now average *less than half* the costs as calculated for 1955 by the AAR.

There's still more improvement—and lower costs—on the way. Magnus Flat-Backs now get better than 2,000,000 miles per hot box. That's equivalent to only one hot box for the life of four cars—*one per 120 car years*. Rear seals last longer. Journals are stabilized for better lubrication and that means maximum bearing life too.

Magnus Flat-Back bearings are cast in automated foundries, lined and machined with the most modern techniques to give you the finest solid-type bearings available today. Write for complete details. Magnus Metal Corporation, 111 Broadway, New York 6, or 80 East Jackson Boulevard, Chicago 4.

MAGNUS
METAL CORPORATION
Subsidiary of
NATIONAL LEAD COMPANY

nel members were R. B. Stampfle, Bethlehem Steel Co.; A. M. Johnsen, Armco Steel Corp.; G. P. McGavock, Norfolk & Western, and O. J. Horger, nken Roller Bearing Co. E. Wynne, vice president, Great Lakes Region, Canadian National, was moderator.

/Vheel, Rail Design Involves Dynamics

Heavier cars are producing problems for designers of wheels, axles and rails; traditional static analysis may be inadequate

ynamic forces may not be receiving fficient attention in the continuing ıntroversy between mechanical and ıck departments over damage being ıused to rails by heavily loaded ›ight cars. This was brought out by panel on Wheel, Axle and Rail Stress oblems Related to Higher Capacity ırs which was part of the program the annual meeting of the Railroad ıvision of the American Society of echanical Engineers last month in ıiladelphia.

Dynamic forces may not even be /en proper consideration in the de- ;n of wheel and axles. Railroad and :el industry engineers showed that ere is no unanimity of opinion on ;t what heavy cars mean in terms of duced wheel, axle and rail life. There emed to be, however, agreement that situation is ripe for a complete en- ıeering investigation.

What is needed is good documenta- ın, supported by real scientific study, cording to E. Wynne, vice president Canadian National's Great Lakes ;gion, who served as panel modera- r. "If we sit back and do nothing," warned, "the industry could pay an tremely high price in years to come. e need to know if we need bigger wheels, harder wheels, harder rails, or some other approach to this problem." Previously Mr. Wynne said that there seems to be general agreement that heavier loading of 70-ton and higher capacity cars does increase wheel and rail shelling. Just how much, and whether higher replacement costs are offset by greater revenues still remain to be resolved.

Panel members were: O. J. Horger, chief engineer, Railway Division, Timken Roller Bearing Co. (axles); A. M. Johnsen, supervising research metallurgist, Armco Steel Corp. (wheels); G. P. McGavock, mechanical engineer, Norfolk & Western (center plates); and R. B. Stampfle, metallurgical engineer, Bethlehem Steel Co. (rails).

"The theoretcial contact area between wheel and rail is a small ellipse which probably varies considerably with the amount and type of wear on the wheel and rail, and also with the lateral position of the wheel relative to the rail," Mr. Stampfle explained. "The metal in the contact area of both wheel and rail is working above the elastic limit of the steel and plastic deformation and work hardening of the metal are taking place. Apparently enough plastic deformation takes place to increase the contact area and prevent further deformation. The plastic deformation apparently increases with the passage of each wheel, so the problem of fatigue arises. This is a unique situation where the metal is working above the elastic limit with repeated loading—and most engineers would say that the material would fail in a relatively short time. Surprisingly, wheels and rails do not fail rapidly, although some shelling is found in both, particularly in heavy-duty service."

Over the past 30 months almost 25% of the cars ordered have been of 85- to 100-ton capacity. While these cars are serving to maintain or increase the railroads' share of the transportation market, they must be operated over tracks and structures usually in existence long before the cars were ordered or even conceived. In addition to this new equipment, track engineers must also contend with the 5% increase in allowable gross weight of practically all existing cars in interchange service. The higher limit was authorized by the AAR over a year ago (RL&C, July 1962, page 23).

Rail engineers, in deciding whether

track structures are adequate to carry these cars, must consider two primary problems, according to Mr. Stampfle:

- Whether rails have sufficient section modulus to keep bending stresses low enough to prevent excessive rail failures;
- Whether wheel-rail contact stresses are low enough to prevent excessive plastic flow of rail-head metal and resultant crushed heads and shelly failures, particularly on curves.

Contact pressure between rail and wheel is rated by Mr. Stampfle as the most important problem to be considered in conjunction with heavy cars. "In fact," he pointed out, "shelling in rails due to high contact stresses was already with us on heavy tonnage tracks carrying 70-ton cars with maximum static wheel loads of 26,250 lb on 33-in. diameter wheels. Shelly spots develop sooner on the high, outside rail on curves, but they will also develop on tangent track with sufficient time and tonnage. The shell, in itself, is not considered detrimental, except that in a very small percentage of them a transverse fracture starts to develop, and with flexing, the rail is soon completely broken in two. "It would appear," he concluded, "that the best solution from the rail standpoint, is to limit wheel loads in accordance with wheel diameter. The precise levels at which allowable wheel loads should be established are a matter of overall economics, which in last analysis, will have to be decided by the railroads."

M. S. Reigel, consulting engineer for the American Iron and Steel Institute, agreed that it is important to increase the wheel-rail contact area. Changes in tread and flange contours should be considered in order to produce more "intimate" wheel-rail contact. "After all," Mr. Reigel said, "all the rail is down—wheels are what should be altered." Mr. Stampfle had indicated, however, that the head contours of recent rail designs do more closely approximate the shape of the average worn car wheel and that this change has proven helpful.

Mr. Johnsen, in discussing wheels, cited three factors which should determine the type that will be applied for a specific service:

- Rim thickness which establishes the replacement intervals;
- Diameter which establishes the load carrying ability and the stresses that are developed;
- Chemical composition and heat treatment which determine the resistance to wear and service damage.

Causes of wear, shelling and thermal cracking are fairly well understood, he said. Wear is caused by metal-to-metal sliding abrasion between tread and brake shoe and between tread and rail. Thermal cracking results from stresses accompanying phase transformations and relaxations when the wheel tread and rim are alternately heated by brake-shoe friction and quenched by rail, windage, and cold underlying metal. Fatigue of the subtread when excessive load exists in the tread-rail contact area causes shelling.

Metallurgical, design, and service factors all affect wear, thermal cracking and shelling. Principal metallurgical factors are carbon content and rim hardness. Higher carbon content causes wear to decrease, thermal cracking to increase, and has no effect on shelling. Greater rim hardness causes wear and shelling to decrease, but has no effect on thermal cracking.

Design and service factors have an even greater effect on wheel life, with service factors involving both operation and maintenance. Wear, thermal cracking and shelling are all increased by heavier loads, high speeds, greater braking forces, and greater frequency of braking. Shelling is also increased by rail irregularities and by reductions in track resiliency.

"Vehicles present a difficult design problems because of dynamic loading and variation in speed, braking and road conditions which are encountered," Mr. Johnsen said. "Adequate measurements of some of the service and maintenance factors are not available and are costly to make. Interactions between the factors are not well understood and complicate an analysis. These factors are constantly changing with time, even in a given service. Consequently a fully quantitative approach to design and selection does not exist at this time. Most needed for deriving adequate design theory are data on actual service stresses or loads, and temperatures, and their incidence."

Class C wheels are recommended to sustain highest loads at low and intermediate speeds with normal freight braking. In lower speed ranges, Class U wheels should not suffer excessive tread damage in high-capacity service, but may be less economical than heat treated wheels. In the intermediate speed range, untreated wheels will probably be marginal on service damage and uneconomical on wear li[fe].

Class C wheels will also be m[ore] suitable for high-speed service, a[c]cording to Mr. Johnsen, provid[ed] braking ratios are not increased a[p]preciably above the 75% of li[ght] weight now used. Even though so[me] high capacity cars have a light weig[ht] of around 90,000 lb, the braki[ng] forces are still only about 50% or le[ss] of those on passenger equipmen[t]. Also, thermal cracking depends to [a] large degree on the amount of braki[ng] and at what speed. Class B whe[els] would be recommended if freight ser[v]ice approached passenger conditio[ns] of speed and braking.

"It would appear that wheel loa[ds] to about 900 lb per in. of circumfe[r]ence can be tolerated in low-spe[ed] service, and possibly in intermedia[te] speed service with light braking a[nd] favorable track conditions," Mr. Joh[n]sen said. "Of course, lighter loads i[n]sure better mileage and less mainte[]nance. Depending upon the lig[ht] weight of the car, appropriate whe[el] diameters of 36-, 38- or 40-in. m[ay] be selected, or six-wheel trucks e[m]ployed. When the triple threat condi[]tions of high load, high speed a[nd] moderate to heavy braking will be e[n]countered, maximum wheel loads [of] about 750 lb per in. should be co[n]sidered on Class B wheels. This lo[ad] appears to be critical on passeng[er] locomotives where there has been wi[de] experience with tread damage. Situ[]ations of intermediate severity wi[ll] probably tolerate 800 to 850 lb per i[n.] on Class C wheels."

Cars making 18,000 to 30,000 mile[s] per year can be equipped with one wear or two-wear wheels, Mr. Joh[n]sen said. For annual mileages in th[e] 75,000-mile range, multiple-wea[r] wheels are recommended.

Several maintenance factors shoul[d] receive attention to assure satisfactor[y] service from wheels applied in suc[h] services. These include:

- Effective center-plate lubrication
- Elimination or repair of excessivel[y] worn truck parts such as pedestal lin[]ers, boxes, and wear pads;
- Proper functioning of wheel flang[e] and track lubricators;
- Proper wheel alignment;
- Proper adjustment and functionin[g] of elements of the brake system.

Mr. Johnsen pointed out that th[e] assumption of static loading betwee[n] wheel and rail can be a misleading ap[]proximation of the dynamic conditions

ich actually exist. Subsequently, W. Ordiorne of Edgewater Steel ., said that the "impasse" between chanical and track people may actlly result from the fact that they are talking about the same thing—that per consideration is not being given dynamic forces. In fact, he contin- l, it might be that a solution to the blem would be to reduce dynamic ds to near static levels.

Along with the higher maximum ds, higher load factors and greater eds of today's freight cars, all of ich tend to increase the forces to ich wheels are subjected, additional esses are imposed by certain track- rk, such as high-speed crossing gs and car retarders. T. R. Freds, mechanical engineer-car, New rk Central, cited these forces while inting out that today's freight cars also making mileages which were dreamed of a decade ago. The one- ar wheel with a life of 300,000 les should enable (and force) rail- ads to inspect bearings and axles at propriate intervals, he said. Such gular inspections might not be made ien two-wear and multiple-wear ieels are used.

Multiple-wear wheels, with their eater rim thickness, could also de- at the purpose for which larger di- ieter wheels are being applied. R. Beetle, chief engineer, wheel prod- ts, American Brake Shoe, pointed t that the 36-in. multiple-wear ieel, when worn to its condemning its, has a diameter of only 32½ in., iile the one-wear wheel would be rapped when its diameter was 35 in. ie load imposed by the worn 36-in. ultiple-wear wheel is almost like that the 33-in. wheel. "If we want to aintain diameter, the multiple-wear ieel should not be used," he con- uded.

Mr. Wynne said that ambient tem- ratures may be a factor in the shell- g of wheels. He reported that the anadian National had a much higher cidence of shelling in Class B wheels locomotives during cold weather.

High dynamic stresses in axles re- lt from track conditions such as irves and rail irregularities (joints, ogs and crossings), according to Dr. . J. Horger, chief engineer, Railway ivision. Track maintenance is very iportant, he added. He proposed de- gns for two new axles of 72,000 and 0,000 lb capacity. The axles, with ominal 7 x 14-in. journals, must con- orm with a wide range of car geometry such as center of gravity heights from 72 to 94 in. and wheel diameters ranging up through 40 in.

The new axles, of the raised-wheel-seat design, would have a body center diameter of 8 in. in the case of the 80,000-lb type. Wheel seat diameter for this size would be $9\frac{7}{16}$ in. and journal centers would be 79 in., the same as used on the 6½ x 12-in. design. The axle would accommodate only roller bearings. Extending journal length to accommodate plain bearings would place the spring nest outside the clearance line and increase the weight of the truck bolster.

"It would be very difficult to design an assembly with lower fatigue resistance in the wheel fit than that of the black-collar axle," Dr. Horger said in commenting on the proposed new axle designs and on the reason for the AAR Mechanical Division's action making the raised-wheel-seat arrangement its new standard. He cited many deficiencies in the classical Reuleaux formula used for axle design, including inadequate approximations of the lateral wheel forces and insufficient consideration of other dynamic forces.

Speed alone does not seem to be a significant factor in producing high axle stresses. This was confirmed by W. M. Keller, vice president-research, AAR, who reported that he has recently issued a report indicating that, in the case of flat wheels, axle stresses are actually lower at higher speeds. He has recommended to railroads that they not operate equipment with flat wheels at very low speeds.

A mechanical department representative of the Quebec, North Shore & Labrador reported that the raised-wheel-seat axles under 3,000 98-ton ore cars operated by his road are performing very well. He said that, of 200 axles given particle inspection after 180,000 to 290,000 miles, only six showed small cracks inside the hubs and no cracks had developed in the bodies. In every case, he said, the cracks could be cleaned up in a lathe. He reported that CR wheels have proved superior to U wheels and had developed no thermal defects. His 357-mile, ore-hauling road is experiencing considerably better wheel life than was the case when it was first opened in 1954, illustrating the effect of stabilized track on wheel life.

The QNS&L has, since 1962, been turning a modified "worn" contour on new wheels so that the wheel-rail contact area will be increased. He said that new wheels with the conventional AAR tread had, in some cases, operated for 4,000 miles with no evidence that the throat of the flange had ever contacted the rail. The modified contour now being used makes this a load-bearing area from the beginning.

Center-plate machining and molybdenum-disulphide lubrication, which might seem to increase wheel life because of the easier steering of car trucks, has been adopted for new cars by the Norfolk & Western, according to G. P. McGavock. To date, the road has been unable to relate flange wear to center-plate treatment, but the process—costing \$4 per car—is being continued. He did report that bolster failures being encountered on a group of 18-year-old cars are probably the result of center-plate condition.

At ASME Annual Luncheon

R. B. Smith

D. C. Bevan

C. E. Tack

Recent railroad technological developments were hailed by R. B. Smith, ASME president. D. C. Bevan, vice president-finance, Pennsylvania, explained that technology alone could not solve the urban transportation problem; that the high investment in and poor utilization of rail commuter facilities requires support by the communities served. C. E. Tack, vice president-engineer, American Steel Foundries, is chairman of ASME Railroad Division. Group's next sessions will be April 14 and 15, 1964, in Cleveland.

What Can Be Done with Aging Traction Motors?

Motors must be reappraised for today service, cautions Chairman Mitchell.

In considering the effects of higher horsepower locomotives, a most important and potentially expensive decision has to be made concerning existing traction motors. This opinion was expressed by the Locomotive Maintenance Officers Association's Committee on Diesel Electrical Maintenance at the recent annual meeting in a report presented by Chairman J. R. Mitchell, assistant electrical engineer, Illinois Central.

Each railroad must analyze which motors are to be overhauled or downgraded for economical use on locomotives that themselves are not candidates for upgrading within a traction-motor overhaul period. The Committee cautioned railroads about wholesale upgrading traction motors because what is currently the latest model may soon be superseded as new locomotive designs are introduced.

Mechanical tolerances of older traction-motor frames are unacceptable for some of the higher horsepower units. Unless wear and distortion are gauged correctly, increased failures will result from distortion of the frame and from poor field-coil and interpole-coil alignment.

The Committee said enthusiastic reports substantiate earlier test results showing the value of rubber-bonded-to-steel nose suspensions in controlling vibration and shock. It noted that, with the high volume usage of this nose suspension, the cost per unit has dropped, and it can be purchased for practically the cost of four coil springs.

Some manufacturers and railroads are applying additional neoprene damping pads and tie-downs on epoxy-mica and silicone-rubber type main and interpole coil leads and connections to prevent breakage due to vibration. Additional tie-down staples and vibration snubbers should be applied to solid and flexible lead connections of epoxy-treated EMD main field coils to prevent them from breaking when used in high-speed mainline service. Failures are apparently due to fatigue under cyclic vibrations. Tests indicate that neoprene snubbers do not change the frequency response of the connections but decrease the amplitude, thereby lowering stresses. The effect of increased speed on vibration and stresses in coil connections is considerably greater than the effect of increased load due to higher power.

As there has been no indication of design changes to decrease the loading of traction-motor armature bearings, the Committee's survey inquired if there has been, or is likely to be, an increase in armature-bearing failures resulting from higher bearing speeds and loads. One manufacturer replied: "Theoretically, yes, but the theoretical increase will not be noticeable since there are many factors other than speed and load which affect bearing life." The Pennsylvania reports it has had no increase in failures of armature bearings used in 752-E5 traction motors rated at 733 hp in a group of 66 E-44 electric locomotives. Another railroad has had low-mileage EMD D-57 traction-motor armature-bearing failures on GP-30 units, but indicates these were the result of poor quality control rather than being due to grease, high speed, or loading.

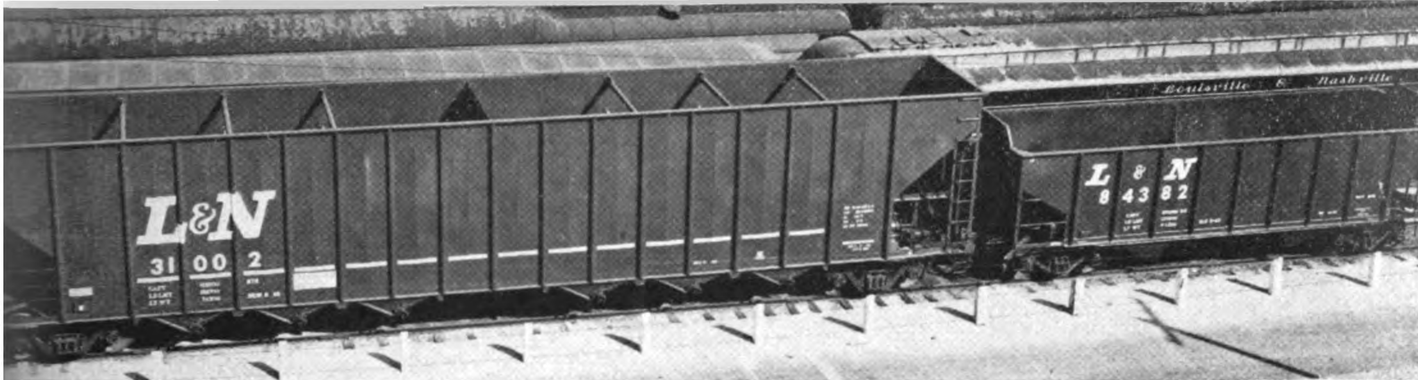
The Cyprena RA or Andok BR type greases are not considered to have reached their limits at the horsepower and armature speeds developed in 752-E5, D-57, or D-67 armature bearings. General Electric approves the use of Cyprena RA for use in its traction motors, but has standardized on Andok BR in its own new and rebuilt traction motors. EMD and the majority of railroads are using Cyprena RA grease in all types of EMD traction motors with good results when nylon anti-churning inserts are used. The D-67 traction motor has anti-churning nylon inserts both in commutator and pinion-end covers.

Some railroads are continuing to have what are considered to be an excessive number of ring- and pinion-gear failures. The pronounced effect of ring-gear tooth profile wear on traction-motor vibration is now widely recognized both by manufacturers and railroads. An accelerometer located on top of the commutator-end bearing housing on a rubber-support-mounted traction motor on a GP-30 locomotiv in high-speed, mainline service recent ly indicated how tooth profile affect force levels. A traction motor wi new pinion and new ring gear regi tered 16 G five times and 18 G onc The same motor, with new pinion an used ring gear with tooth profile wea of over .010 in., registered forces 16 G over 9,000 times, 18 G ov 8,400 times, and 23 G 2,600 time

The grade of pinion and ring-ge lubricant is considered to be of prim importance in higher horsepower ap plications. The use of "Jet type" lub ricant is definitely recommended an controlled lubricant level is a must.

The new gear-case designs hav proved to be only partially effecti in controlling ring-gear and pinio lubrication. The basic problem is th although the gear case is usually rea sonably leak-proof when first applie excessive leakage develops after th case has been removed and appl several times. Tighter designs an more careful handling in railroa shops are essential with the lower vi cosity lubricants needed for hig horsepower locomotives.

The EMD gear cases are partic larly difficult to hold tight. Sever railroads report that the modificati of old EMD gear cases to the new re turn-duct style is difficult and exper sive. The railroads are having troub in determining the amount of gre that is in the gear case so as to kno how much to add. A prescrib amount of grease, based on serv experience, is applied at intervals up by each railroad. Many gear cas are being overfilled and greas wasted. There are also gear failur due to dry gear cases.



ood chip car 72 ft long and 15 ft 3 in. high dwarfs standard 36-ft, 50-ton coal hopper to which it is coupled. Small car's cube of 2,200 cu ft less than one third that of larger hopper. Paper mills' use of wood chips has grown dramatically in recent years.

Nood Chips Move in Huge Hoppers

Wood chip cars keep getting bigger id bigger. Largest to date are the 000-cu ft, 100-ton hoppers which e Louisville & Nashville has just put service. The 50 cars, built by Ort-r Freight Car Co. at a unit cost of 8,300, are operating on the south-n part of the L&N where numerous iper mills are located. By encourag-g heavier chip loading, the high-cube sign is making it possible for the rail-ad to establish incentive rates on this w-density commodity.

The cars have several features hich aid in discharging the lading, astically reducing shaking time. onsequently, maintenance costs are pected to be significantly lower. versize hopper openings, smooth in-riors coated with a special lining, and les tilted inwardly at the top all al-w the wood chips to flow rapidly om the car.

The car is divided into two 50-ton mpartments, each of 3,500 cu ft pacity. With a 10-in heap, the car's tal capacity is rated as 7,540 cu ft. ength over coupler pulling faces is ! ft 4 in.; length inside body, 68 ft ⅛ in.; inside width at top chords, ft 8 in., and at side sills, 10 ft. Truck nter distance is 55 ft 9 in., and ight from rail to top of car 15 ft 3 in. ght weight is 74,300 lb.

The hopper doors are equipped with sistance springs, developed by Ort-r engineers. These spring units ishion the doors as they drop to a lly opened position and hold them hile the load is discharged. When e car is empty, the springs balance e doors so they can be closed easily one man. There are six pairs of hoppers. Doors are reinforced with a grid structure welded to the outside face and are equipped with hook-type locks.

While basically a welded body design, Huck bolts are used for connecting sides to body bolsters and center bulkheads and in attaching grab irons and sill steps.

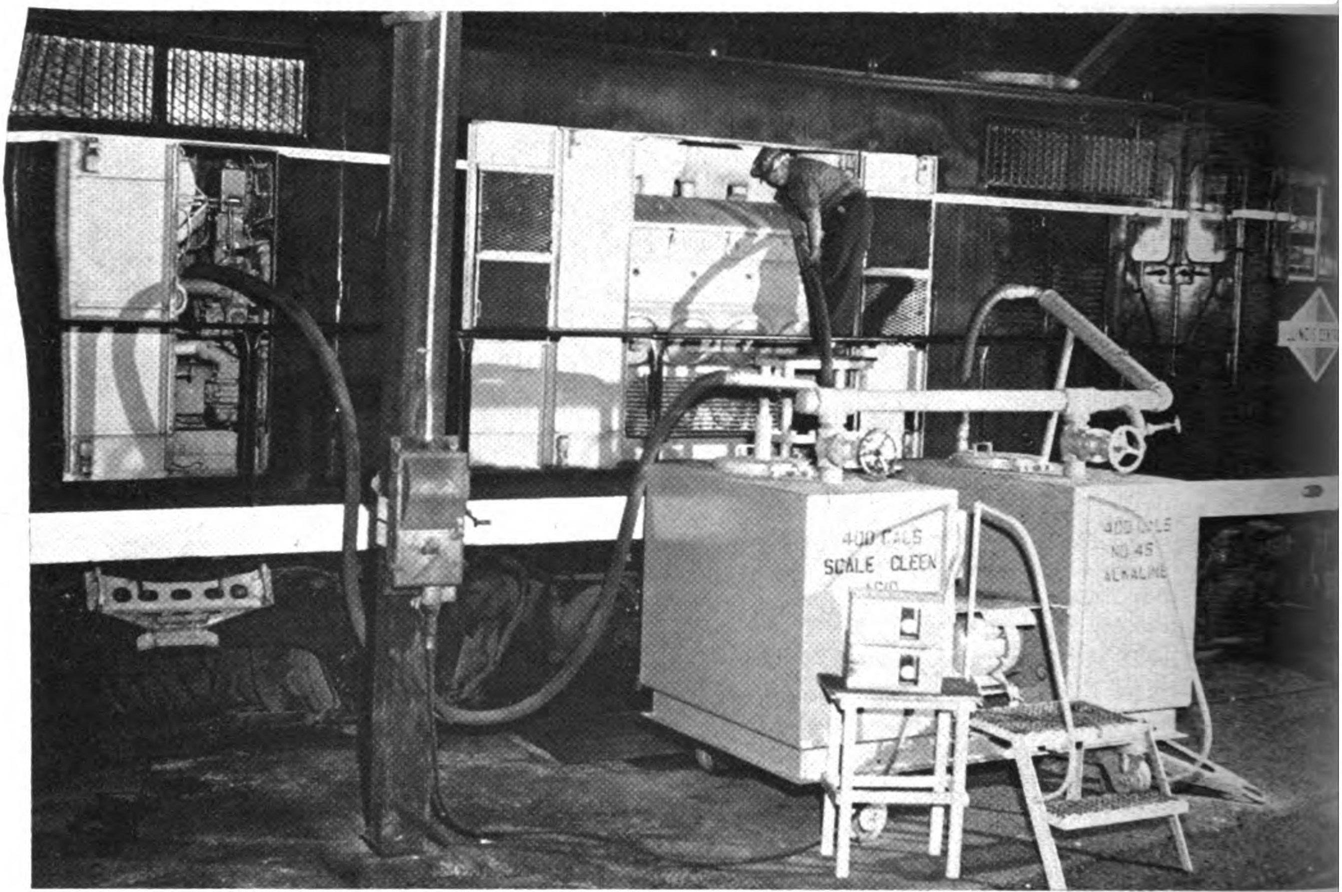
The center sill consists of two Z- 26, 41.2-lb Tri-Ten sill sections extending between one-piece cast-steel draft sills. The four transverse ridges per car are positioned to support the door hinges and are designed to minimize interference with flow of material during unloading. They are $\frac{3}{16}$-in. plate and have a slope of 40 deg. Longitudinal hoods are fabricated from $\frac{5}{16}$-in. plate. Hopper sheets are formed of $\frac{3}{16}$-in. material.

The 8-gauge side sheets are pre-crimped to give more rigidity and are reinforced with pressed exterior side stakes. Angles 5 x ½ x ⅜ in. are used for top chords and side sills. At each of the transverse ridges the side sheets are braced diagonally with 4-in. pipe extending from the transverse ridge near the center sill to a point on the side sheet 20 in. below the top chord. The side sheets are tied together with six 4-in. pipe crossties.

Top of the ¼-in. center bulkhead sheet is 4 in. below the top of the car. The sheet is reinforced at the top and center with angles. The $\frac{3}{16}$-in. slope sheets are applied at 40 deg—same slope as the crossridges.

Paper mills use growing volume of wood chips. Many roads are building or converting cars to handle them.

Sides sloping outward slightly from top of car are designed to speed lading discharge. Crimping of side sheets is intended to increase their rigidity.



High-pressure hoses are connected to the suction side of the water pumps and to the discharge line between engine and radiator to produce a closed loop between radiators and cleaning machine. Solution flow is opposite that of normal coolant circulation.

Mobile Descaler Cleans Radiators

In-place cleaning of diesel locomotive radiators using a cleaning compound and descaler pumped from a mobile cleaning machine is resulting in sizeable cost savings at the Memphis, Tenn., diesel facilities of the Illinois Central. Cleaning of a locomotive's radiators is now done in one-half day; it formerly required two men at least two days to remove, rod and replace a radiator. The IC plans to clean the radiators of all its locomotives as they move in and out of the Memphis shop. Once all units have been cleaned, additional cleaning will be scheduled as the locomotives receive their annual inspections.

The caster-mounted cleaning machine was fabricated by the IC's mechanical department. It consists of two 400-gallon steel tanks equipped with steam heat coils and an electric-powered 800 gallon-per-minute centrifugal circlulating pump.

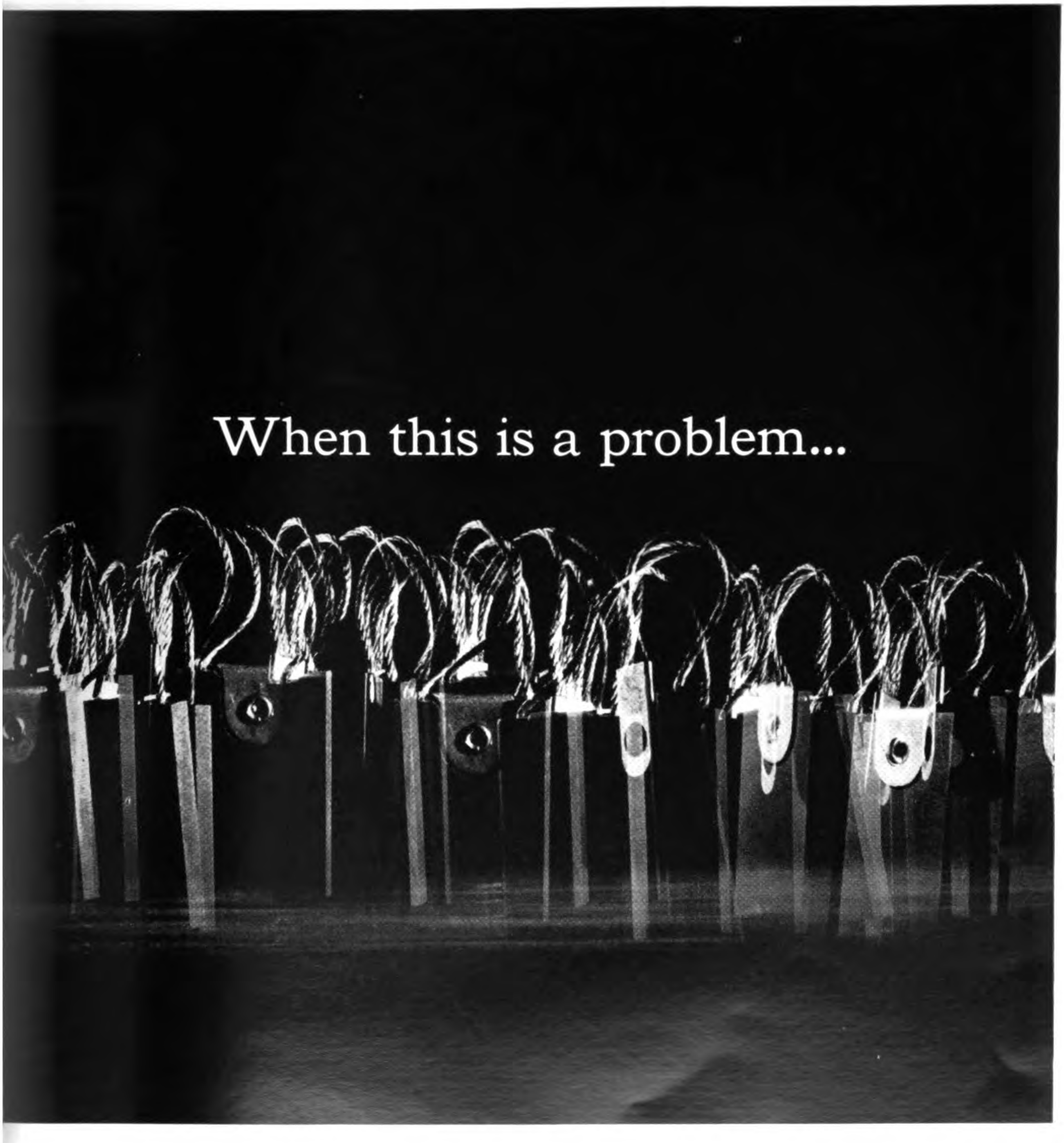
Two solutions, both supplied by Dearborn Chemical Co., are pumped through the diesel radiators during the cleaning process. Dearsol 45, an inhibited alkaline cleaner and heavy carbon remover is circulated and followed by Scale-Cleen, an inhibited sulfamic acid descaler. Scale-Cleen is a powdered acid which is harmless to handle in a dry state. When dissolved in water, it forms a quick acting and complete cleaner of common scale deposits. The inhibitor is reported to prevent corrosion of metals such as aluminum, copper, steel and cast iron.

Color Indicator

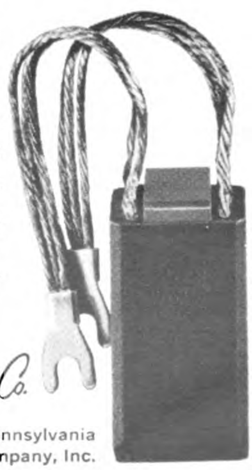
The acid solution is reddish-purple when fresh. It turns orange when approximately 80 percent is used and yellow when exhausted. This built-in color indicator shows when the acid is spent without need of testing equipment. In cases of heavy scale, additional acid can be added to keep the solution at proper strength.

In preparing a radiator for cleaning, a Y-fitting is applied to the cross-over line between the two water pumps on the locomotive. Connections are made to the suction side of the pumps with one hose from the cleaning machine. The other connection is made on the discharge line of the engine just ahead of the radiator. This arrangement establishes a closed loop between the solution feeding tanks and radiators which permits the solutions to be pumped counter-current to the regular radiator coolant flow. This back flushing action, coupled with an 800 gallon-per-minute flow rate, effectively dislodges scale the acid loosens.

Actual cleaning time requires about 1½-hours once the connections are made. Dearsol 45 is circulated for 15 min to remove oil and grease and prepare the radiator interior for acid cleaning. Scale-Cleen is then circulated for about 45-min. A rinsing period of 20-min or until the rinse water shows no residual acid completes the process. Both the alkaline cleaner and acid descaler are heated to approximately 130 deg F in each solution tank.



this is the answer



It's that little neoprene pad (red) that takes the shakes. Sort of a buffer that reduces vibration, eliminates uneven wear and lengthens brush life. You get improved commutation, more uniform wear, lower operating costs; no broken hammer plates, no shunt fraying, less flashovers, less commutator threading. You get Speer Red Top Multiflex Brushes, one branch of a large and efficient family of high quality brushes for electrical rotating machinery. To get to know the family better, write for complete details.

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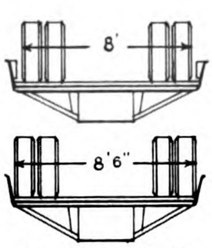
What's Piggybacking USA? It's moving more than a million truck-trailer loads a year through searing heat and numbing cold. It's carrying over two million new automobiles to dealer showrooms to meet the car buying demands of the American public. It's providing a new system of distribution that links the economies of rail transportation with the mobility of over-the-road truck-trailer pick-up and delivery.

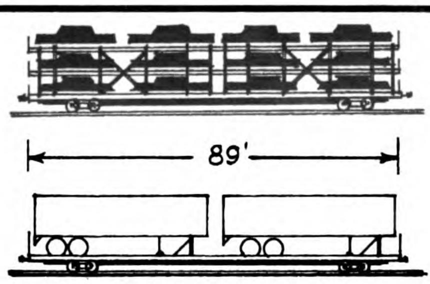
Equipment has to be tough to take the punishment of around the clock, every day, all year, piggyback service. Also, equipment has to be versatile to accept the different lengths and types of truck-trailers or the various designs of tri-level and bi-level auto racks. That's why Trailer Train has selected Pullman-Standard as a major supplier of piggyback equipment. Trailer Train knows from experience that Pullman-Standard flat cars, like the PS-4PB, will stand up to the rugged service demands of its member roads.

When introduced in 1958, the PS-4PB Flat Car helped Trailer Train get piggybacking rolling . . . and in doing so earned a reputation for hard work and dependability. Now the PS-4PB has undergone its first major change—an increase in deck length to 89'. This added length means the new model PS-4PB will accept longer 1964 design auto racks.

For an illustrated brochure on the new 89' PS-4PB Flat Car contact your nearest Pullman-Standard sales office or write George L. Green, Vice President—Marketing.



Convertible Side Sill
For 8'0" and 8'6" trailer widths.



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Ideal for all auto rack applications and all lengths and types of truck-trailers.

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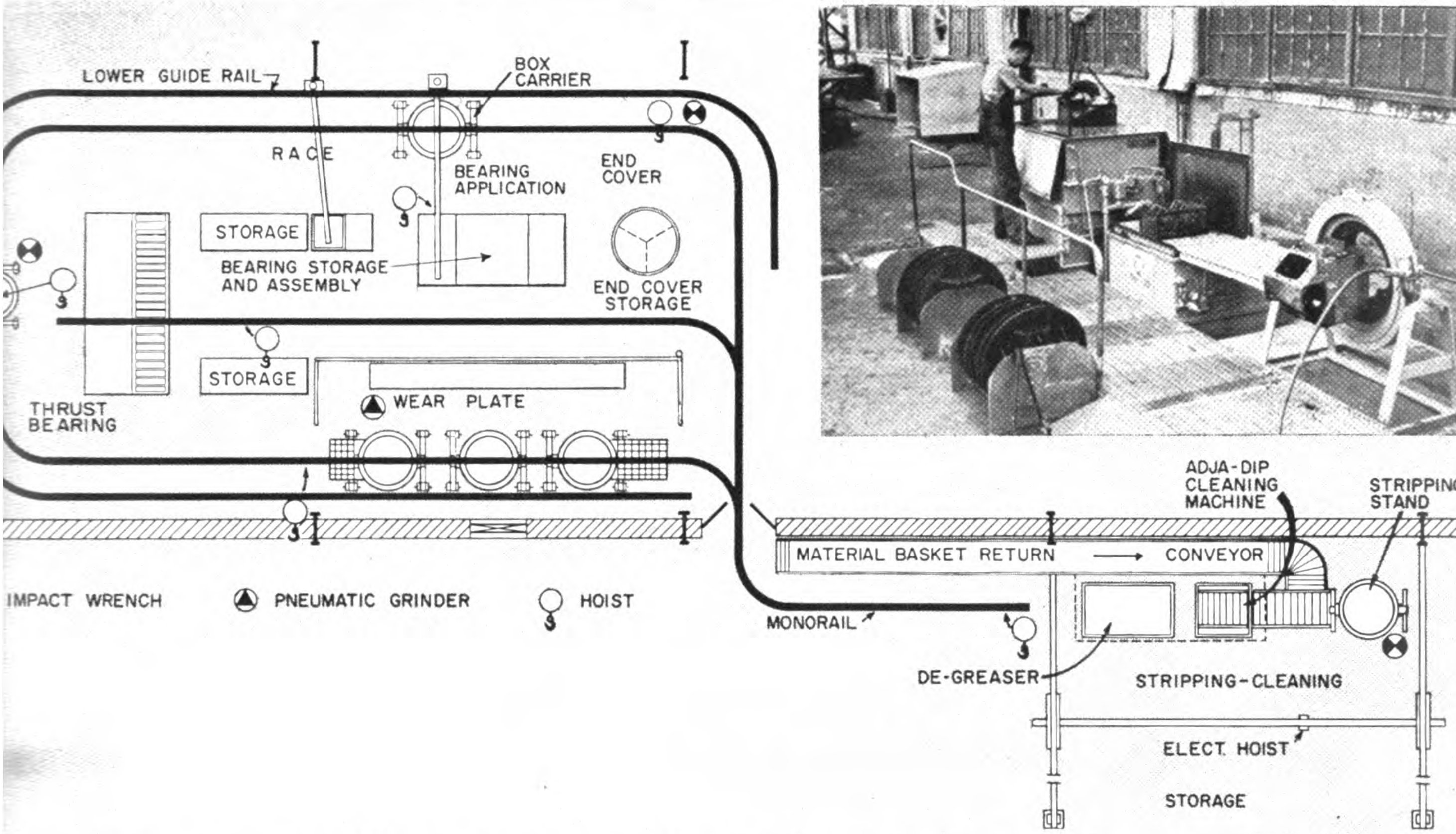
TRAILER TRAIN

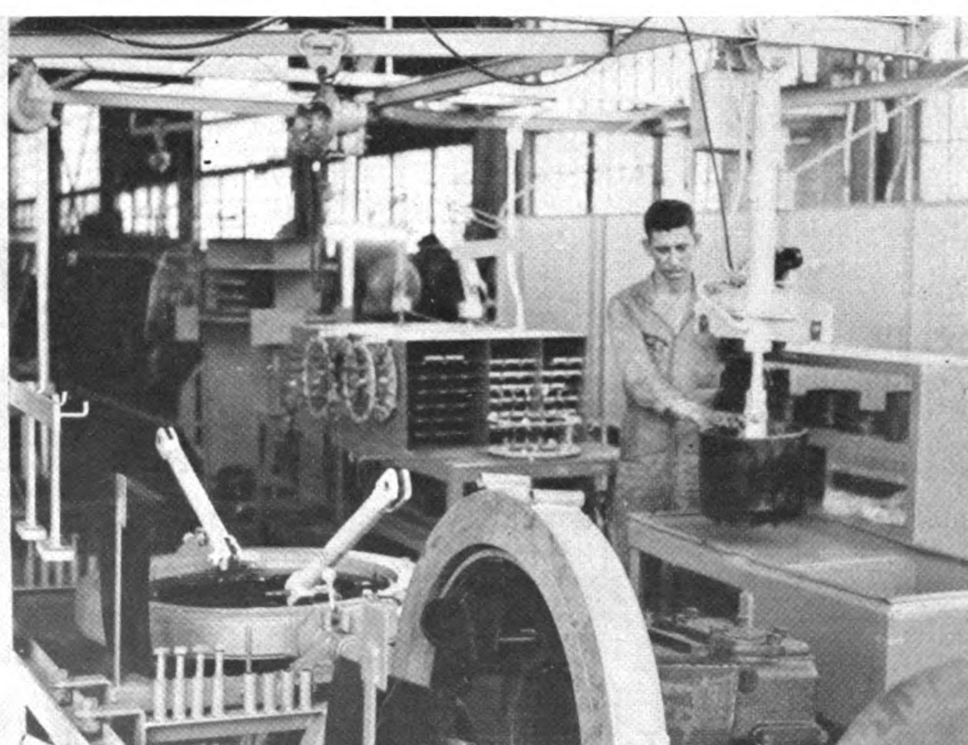


Storage, stripping and cleaning areas (shown also in insert) are located outside shop beneath canopy. Inspection and assembly are performed inside building with tramrail which passes through doorway being used to move in the cleaned boxes and components.

Shop Rebuilds SAL Roller Bearings

Line makes possible systematic procedures for disassembly, cleaning, inspection and assembly of journal roller bearings.

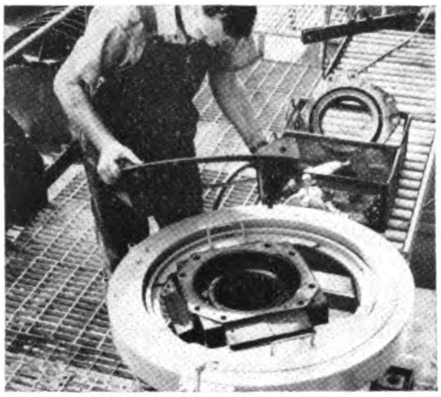
Roller-bearing journal boxes for locomotives and passengers cars are inspected and rebuilt on a specially tooled line recently put in operation at the Seaboard's shop in West Jacksonville, Fla. The new facilities have concentrated in a single area those operations formerly done at several points in the locomotive backshop. Tooling and arrangement of this line assure systematic procedures for the bearing cleaning inspection and rebuilding processes.



Inspection and assembly are completed at end of line. Hydraulic puller removes race for cleaning and checking. Bore is also inspected. Replacement parts are stocked nearby.

Journal boxes involved are a variety of slip-on oil-lubricated types. They come into the bearing overhaul facilities of the locomotive backshop from line points, from the wheel pit at the West Jacksonville roundhouse which makes locomotive running repairs, and from locomotives undergoing repair in the backshop itself. Layout of the facilities and design of tooling and handling equipment are based on Seaboard's extensive experience with these bearings. First diesel-electric passenger locomotives went into serv-

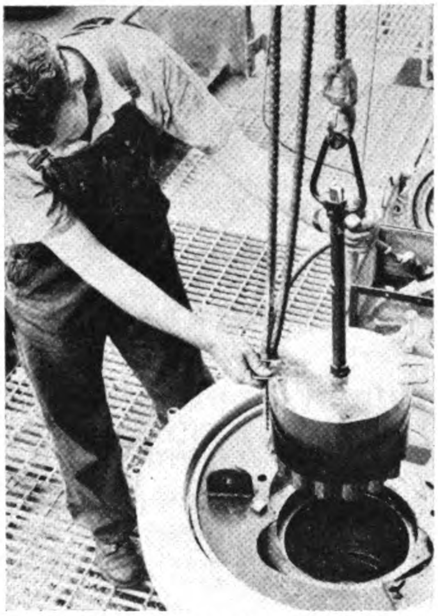
Seaboard Bearing Shop



Adapter plate, applied with cap screws and used with any style of box, remains on it all through disassembly and assembly.

Retaining plates are removed as box, with adapter attached, is raised. When box is lowered, adapter fits in ring on frame.

Overhead hoist lifts bearing assembly and its handling device. Separate devices with different sleeves are needed for four bearing sizes.



Inner and outer sleeves of assembly handling device hold rollers in cage as assembly is pulled from box after cams open to contact cage.

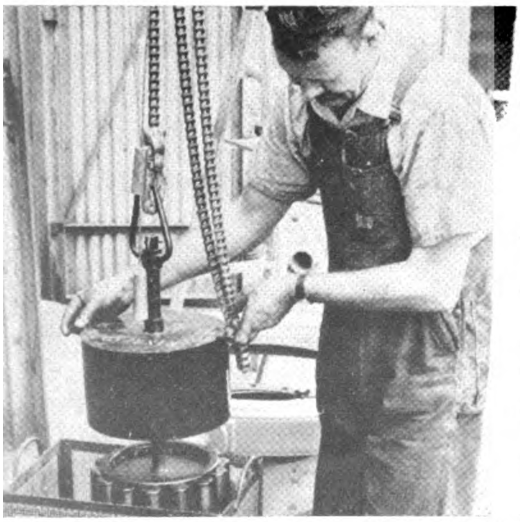
ice on Seaboard about 25 years ago.

Facilities consist of a stripping and cleaning area under a canopy along one of the outside shop walls and the inspection and rebuilding area which is inside the shop, only a few feet away. Stripping and cleaning areas are served by a 1,000-lb hoist mounted on a small bridge crane. This also covers the storage area where incoming boxes are classified and stored.

Bearings are handled mechanically at every stage of their overhaul. Roller conveyors and overhead monorails are used for moving parts from stripping through the subsequent cleaning processes. The monorail then continues on into the shop, transporting carriers containing the baskets of roller-bearing and journal-box parts as well as the box castings. Another roller conveyor returns empty parts baskets.

In the shop, the box is placed in a wheeled carrier in which it continues through the rebuilding process. This carrier can be positioned to simplify each stage of reassembly. Monorails through the rebuild areas extend to those areas where the internal box components are stored prior to reuse. Parts baskets, which travel on these monorails, are unloaded in racks where the parts are inspected and classified as they are stored.

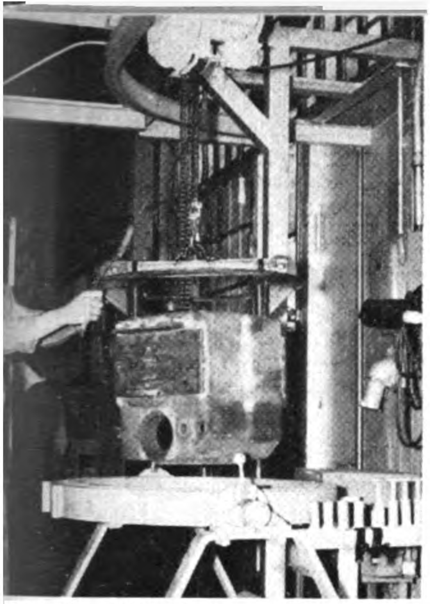
The SAL does not attempt to reuse rollers, cages and spacers in the boxes from which they are removed. Other parts — covers, spring groups and guides, and thrust bearings — are tagged so that they may again be applied to the box from which they came. Boxes are normally processed through the line in groups of six.



Rollers and cages are deposited in cleaning parts basket on roller conveyor approaching Aja-Dip machine. Raised sleeve releases rollers.

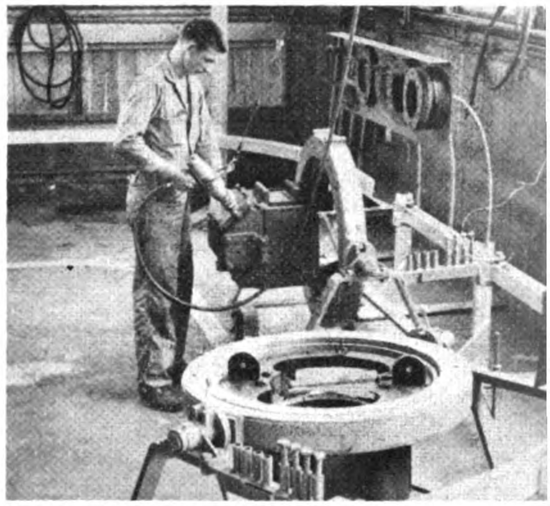
Cams retracted into inner sleeve, hoist can remove the bearing handling device. Cages and rollers are in parts basket now for cleaning.

Carrier in which adapted plate and journal box are mounted is rotated to vertical so cover and thrust bearing can be removed.



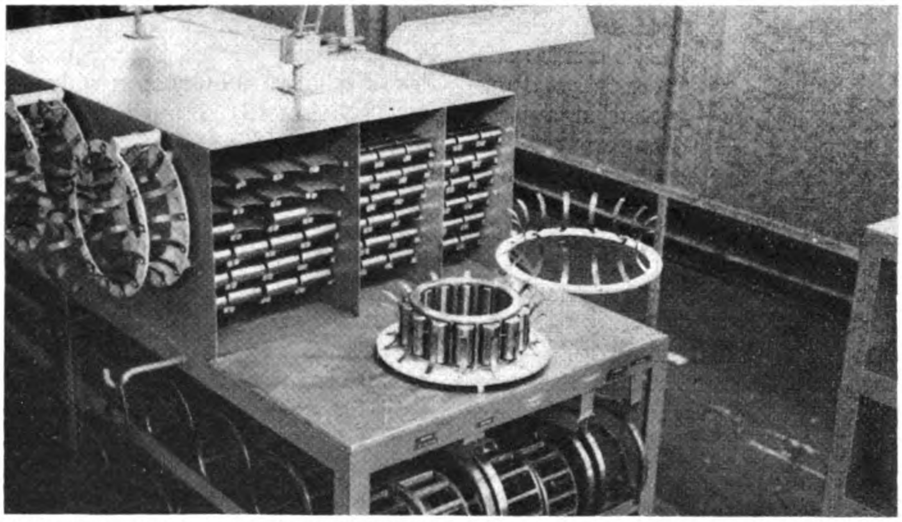
:leaned box with adapter is brought into shop o go on carrier which is mounted on four casters ınd is supported by guide rail.

Box, which can be turned any way, is rotated at wear plate station so defective plates can be removed and new ones welded in place.

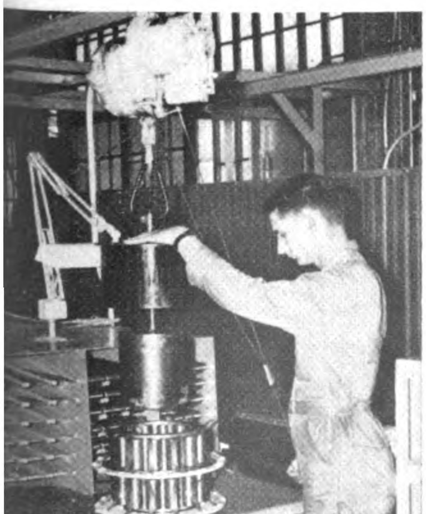


Carrier rolls along guide rail with box positioned so thrust assembly may be installed. Pneumatic tools are on balancers.

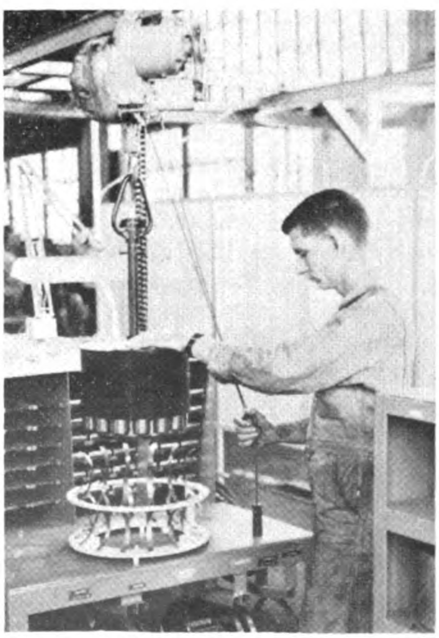
ox, rotated to vertical, is brought to hydraulic ace puller. Its 3,000-psi system can exert 7.5-on pull on bar under race.



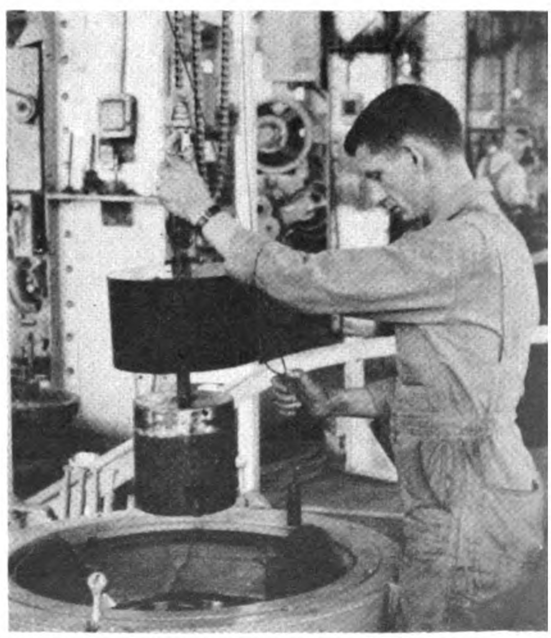
Holder for bearing has base plate with four pins to locate cage; swiveled top plate for second roller set. Each plate has 14 clips. Parts are checked and sorted at rear of rack.



loist on jib crane supports handling device like hat used earlier for stripping. Here it is used or installation of assembly.



Bearing is lifted from assembly device to be moved to box which has now had race installed. Monorail system brings in loaded parts baskets.



Bearing assembly has been installed in box. Handling device is withdrawn. "Overflow" positions assure steady production at work sites.

J. J. Dwyer

What Is Your Problem?

Prepared in cooperation with the Locomotive Maintenance Officers Association, these are offered as practical—but not the only—solutions to current locomotive problems. Material is compiled by the LMOA "What Is Your Problem?" Committee under the chairmanship of J. J. Dwyer, chemical engineer, Chesapeake & Ohio-Baltimore & Ohio. Problems and solutions submitted to the Editor by readers other than LMOA members are also welcomed and published.

Lube Oil Compatibility

Can lubricating oils which are shown by laboratory analysis to be compatible be successfully mixed in diesel engines?

A positive way to test a specific oil to determine if it can be successfully operated in a diesel engine and be compatible with other lubricating oils requires the following:

- Complete laboratory analysis of the oil;
- If the lubricating oil shows promise upon completion of the laboratory analysis, it should undergo a field test in locomotive engines;
- At the conclusion of the field test, engine conditions should be rated with known standards.

Laboratory Analysis. Research has determined that a lubricant for railroad diesel locomotives should satisfactorily lubricate the engine and possess all of the following characteristics under severe service conditions: The oil should prevent ring sticking and should not cause ring breakage. It must be non-corrosive to bearings, filters and other engine parts, show high resistance to scratching of rings and liners, and produce minimum liner, ring and thrust washer wear. Adequate lubrication of silver bearings must be insured. It must not clog oil channels.

A satisfactory lubricating oil should not contribute to injector sticking, nor should it produce deposits of ash, carbon, sludge or varnish sufficient to interfere with engine performance. Dispersant activity should not be sufficiently greater than that of other approved oils so that following one such oil with another in an engine will result in dispersing or "fluidizing" already deposited sludge to the extent of damaging bearings, liners, pistons or rings. It should be sufficiently compatible with other approved oils that mixtures of such oils in the engine produce conditions equal to, or better than, the poorest results from any individual oil in the mixture. The oil must have sufficient stability toward oxidation and loss of additive activity so it will perform satisfactorily through minimum oil change periods of 30,000 miles in heavy freight and 60,000 miles in heavy passenger service. It should be capable of reclamation and refortification with additives for further use in locomotive diesel engines.

It is not yet possible to devise complete chemical, physical, or laboratory engine tests which cover all these service requirements. Laboratory tests, however, can be used as a screening procedure to eliminate nearly all unsuitable lubricants. These tests should be performed in the order in which they are listed because they are arranged in ascending order of time and money required for succeeding tests.

Field Test. Assuming that the oil shows *promise* by having successfully qualified under all the laboratory tests, it should then be suitable for full-scale service test. Satisfactory for the field service test would be an EMD 567-C engine for these reasons:

- Heavy-duty oils which satisfactorily lubricate this engine and will not corrode copper-lead bearings are also usually satisfactory in the other engines;
- Engine lends itself readily to service test inspection;
- It is easier to standardize service testing on one kind of engine;
- Using one kind of engine simplifies comparison of the results of a number of tests.

A minimum test should place *two* units on test oil. Another unit should use an approved oil designated as control oil. These units should operate as part of the same locomotive. It is necessary to duplicate the performance of a normal engine and those employing the test variable. It is desirable to test two engines to protect the test program against unexpected failures of engine parts, unpredicted maintenance, or a derailment. Both units on test oil should receive an equal amount of lead and trailing unit operation. Engines of the two units comprising the test shall be identical in all respects and should be equipped with builder's standard production parts and accessories. Both engines should receive the same maintenance and be kept operating under as nearly duplicate conditions as possible.

All tests should be started with new or overhauled engines which have been equipped with completely measured test parts and thoroughly washed down prior to being charged with fresh lubricating oil. A minimum of four new power assemblies should be installed for evaluation. If only four complete new power assemblies are used, such parts should be installed at the 2, 10, 7 and 15 cylinder locations in all engines. The following part measurements must be accurately recorded:

- Exhaust valves—Stem OD and seat runout;
- Piston—OD, ID and ring grooves;
- Piston rings—Gap and width;
- Thrust washer—Thickness;
- Floating bushings (567-A, 567-B and 567-BC engines)—OD and ID;
- Piston ring—OD;
- Exhaust valve guide—ID;
- Cylinder head exhaust valve seats—Runout;
- Exhaust valve leakage test—Vacuum cup lifter;
- Cylinder liner—ID;
- Piston carrier—OD, ID and platform-to-bushing or pin bore;
- Connecting rod sleeve—ID;
- Connecting rod bearings—Shell thickness.

Lubricating oil filters should be of type furnished by the builder of the engine. Engines should be completely load tested and power pistons adjusted at the start of the test so that the manufacturer's recommended speed and horsepower are obtained with the specific fuel which will be used during the test. These power piston settings shall be maintained throughout the test.

Inspection and Appraisal. When the field-service test begins, a schedule

of inspections must be established. The primary objectives are to insure that normal locomotive conditions are maintained and to observe the effect of the test variable. For adequate control of overall locomotive conditions, "On the Road" and "Pit" inspections should be performed at least quarterly. Fuel-oil filters should be changed at least every 30 days, and lube-oil filters changed every 15 days. Carbody and engine air filters should be changed in accordance with the railroad's maintenance instructions. Lubricating-oil drain periods should be six months. While this is not to be considered as a recommended oil-change period, it is established only to standardize the test procedure so that results capable of being universally interpreted will be reported. Lubricating-oil drain periods other than six months may be established if this is a basic purpose.

Test headquarters should be advised promptly by wire of any unusual conditions which develop during the test, or of any engine parts removed for any reason. Power assemblies or other parts removed during the test for any reason must be retained without cleaning for inspection by the test supervisors. It is important that all test and parts-removed records be accurately maintained and that copies of these records be forwarded promptly each month to the test supervisor who should check them for significant trends and determine if the test is being properly conducted.

A sample of lubricating oil must be taken at the initial filling of the engine and thereafter samples should be obtained just before each filter change. Additional oil samples should be taken any time any unusual condition develops during the test. All samples should be taken from the crankcase with the engine running and with cooling water temperature about 100 deg F. All lubricating-oil samples should list the last filter-change date, last lube-oil change date, and engine hours since such changes. A sample of new lubricating oil should be taken from the storage tanks every 30 to 60 days.

Experience indicates that a complete evaluation of a lubricating oil cannot be made in less than 3,000 hr of operation in fifth throttle notch or above. This allows full seasonal variation and sufficient time for the development of small differences which may become significant at extended mileages. The test, of course, may be terminated at any shorter period if the supervision agrees that the test oil has failed, or it may be run longer.

Upon the conclusion of the field service test, the measured test and control parts must be removed from the engines and completely inspected. The parts should be measured in the same manner as when installed. This should be performed by the same people who made the original measurements to reduce the human variable. Deposits on the various parts should be evaluated before measurements are taken. A complete photographic record of all parts must be made to facilitate rating.

From the factual data established, it is possible to draw conclusions with regard to engine deposits, wear and performance as affected by lubricating-oil differences.

Examples of various forms, charts and measurement procedures that may be used in conducting the tests and evaluating the parts are contained in the "Test Manual, Locomotive Diesel Engine Lubricating Oil and Fuel Oil, MR-305, Revised November 1958," prepared by the AAR Mechanical Division Committee on Lubricants and Fuel for Diesel Locomotives. This book is available from the Mechanical Division. It is recommended that conditions found upon the conclusion of the field service test be rated in accordance with the "CRC Diesel Engine Rating Manual" (CRC Manual No. 5, revised November 1959), prepared by the Rating Panel Full-Scale Test Techniques Group, Diesel Vehicle Fuel, Lubricant and Equipment Research Committee of the Coordinating Research Council, Inc.

Compatibility of lubricating oils can be established by making the foregoing test on mixtures of oil. Any railroader recognizes that a test of this nature is time-consuming and very expensive.

I. L. Frye, master mechanic, Baltimore & Ohio.

Air Compressors

What is the solution to air compressors overheating and to oil and condensation deposited in air lines on the locomotive?

There are many different types of air compressors for diesel locomotives. It is up to the individual railroad to order proper air compressors for its locomotives—They must take into consideration the load factor (60%, 70%, 80%, 90%, or 100%) to which the machines will be subjected. Air-cooled air compressors are very good provided they are used in the types of service for which they were designed and if ambient temperatures are not too high.

Water-cooled air compressors and water-cooled cylinders and heads are designed for 100% load factor, assuring uniform temperatures at cylinders and heads. The piping arrangement for this water system must be arranged for good circulation. When water-cooled air compressors are used, their life is longer than that of air-cooled compressors and maintenance is reduced. The seepage of oil into the brake system and condensation are reduced by the uniform temperatures maintained in these compressors.

K. Pruchnicki, supervisor locomotive maintenance, Southern Pacific.

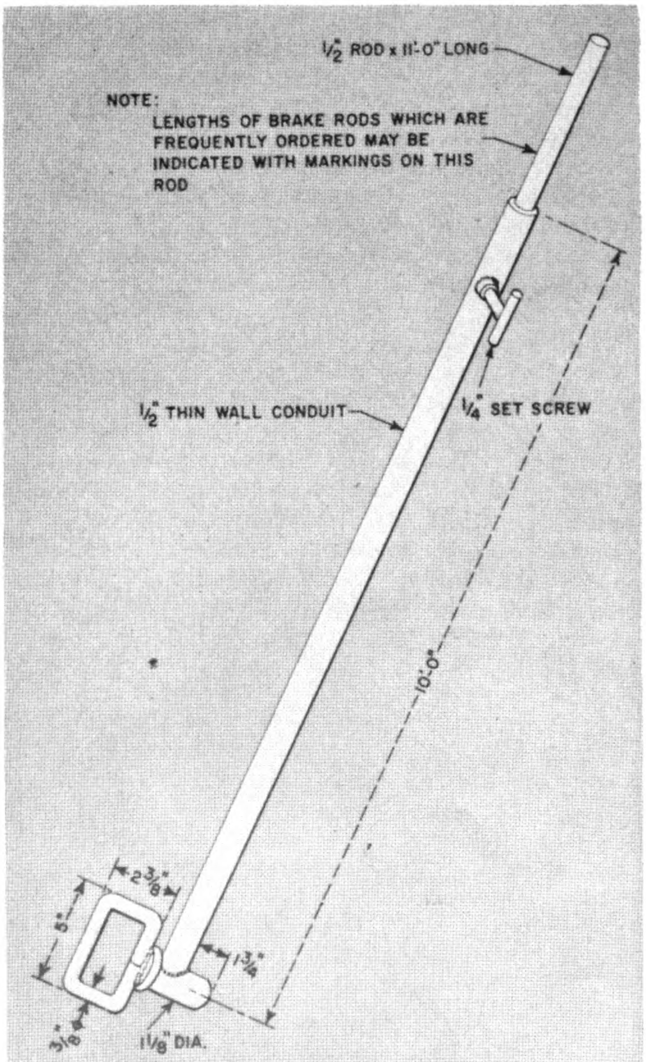
Resumption of electrified freight service between New York City and New Haven, Conn., has been made possible by New Haven's acquisition of 12 ex-Virginian 3,300-hp rectifier electric units.

Car Repair Time Savers

Gaging Brake Rods

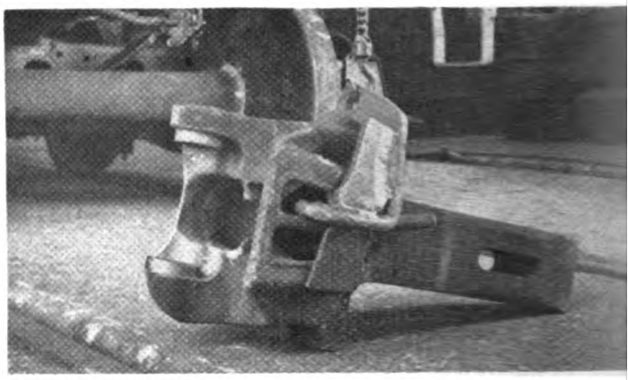
A telescoping gage is now used to measure the exact lengths for brake rigging rods to be produced for freight cars at the Centralia, Ill., shop of the Illinois Central. The gage formerly used was a ½-in. rod with a brake pin welded on the end. A rule was used to mark the length of the desired brake rod on the gage. It was difficult to use a gage much longer than the brake rod which was being produced.

The new gage consists of a 10-ft length of thin-wall conduit with a 1⅛-in. brake pin welded on one end. The 11-ft telescoping section of ½-in. rod is graduated in 1-ft lengths. Lengths of brake rods frequently ordered are also marked on this telescoping portion. The Illinois Central has found this measuring arrangement to be accurate and much more efficient than the system which was formerly used.



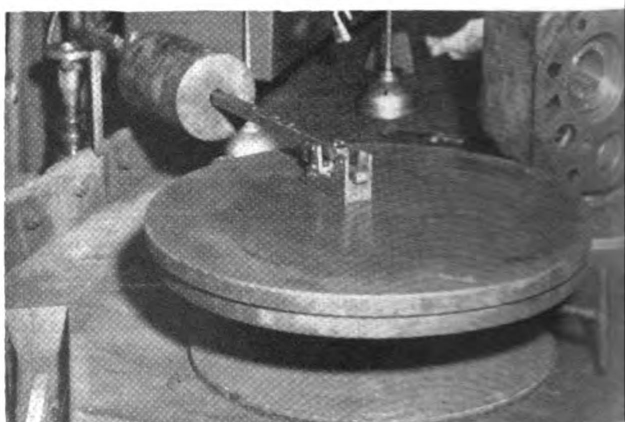
Tube and rod are combined to produce gage which IC shop uses for setting lengths of brake rods it produces. Device is light enough to be readily portable and can easily be handled around cars.

Handling Couplers

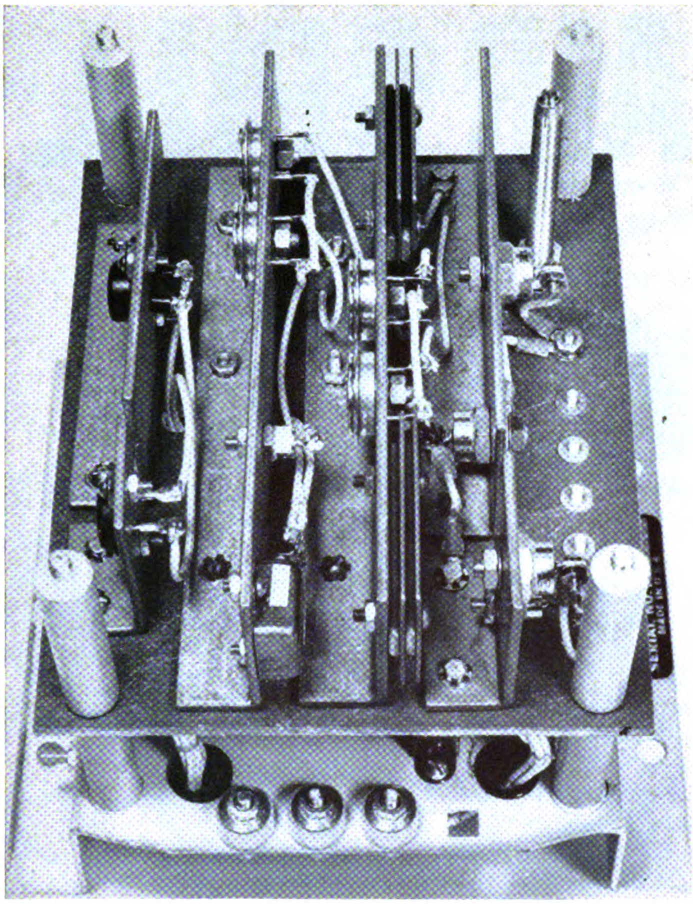


A lifting device which has simplified the handling of cou lers is used in the freight-car shop of a midwestern ra road. The device, consisting of a 1-in. diameter rod be to hook into the side of the coupler and with two plat welded so as to prevent the coupler from turning whi being lifted, has proved fast and safe. It can easily b moved from one location to another. The design permi it to lift either top- or bottom-operated couplers. It ca be used regardless of whether the knuckle is in place has been removed.

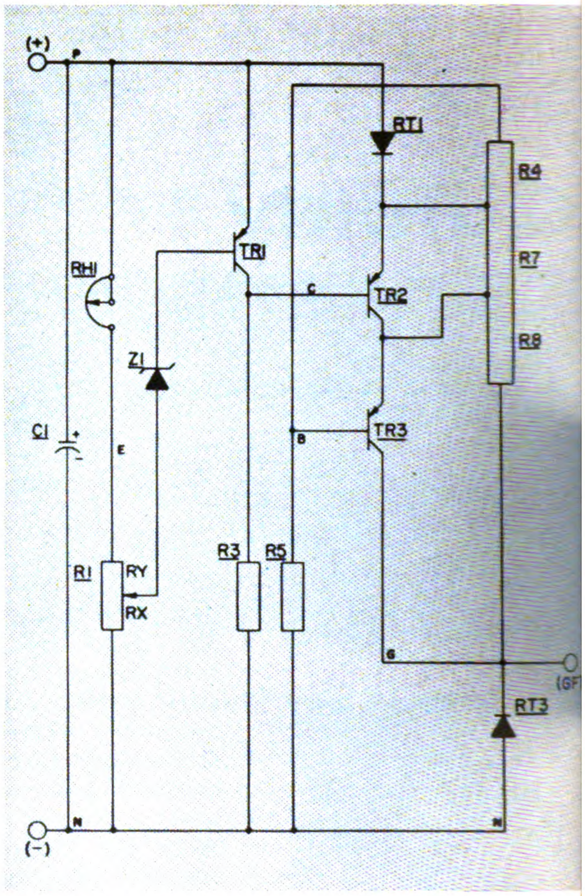
Lapping Brake Valves



Air-brake valves and valve seats are lapped on a speci device at the Springfield, Ill., shop of the Chicago & Ill nois Midland. An eccentric wheel, powered by com pressed air, gives a push-pull motion to the weighted re ciprocating arm, applying the same pressure with eac stroke to hone the valve seat. The valve itself is hone using the same weighted arm, on a smooth, flat surfac coated with buffing compound. The device, selected as th best suggestion of the year by the C&IM, was develope by C. M. Bobbitt, car inspector, and E. O. Vanfosse machinist.



Semiconductor devices are principal features of the regulator. Engineers designed to cover variable conditions which locomotive service imposes.



Basic schematic shows principal circuits. Family of regulators f varying requirements all incorporate this same arrangement.

Transistors Are Used in Regulator

The transistorized Fairbanks-Morse voltage regulator for diesel electric locomotives has been widely applied since its development. Design of this device involves a tunnel-diode-transistor hybrid circuit for current limit control. This is done so that maximum continuous armature control of the generator cannot be exceeded but can be maintained. Using the peak current point of the tunnel diode as a reference signal and providing appropriate bias allows regulation of a small signal voltage. By developing this signal voltage across a small armature resistor, current is controlled.

Locomotive auxiliary generators supplying direct-current for battery charging, main generator excitation, and auxiliary control functions require accurate voltage regulation over a wide range of continously variable speeds and loads. Transistors used in the switching mode, arranged in circuits which utilize the auxiliary generator as a switch frequency controlling system, regulate the generator voltage to acceptable tolerances. Tunnel diode current regulation restricts the armature current to a safe value at any voltage level. In designing this regulator, Fairbanks - Morse engineers gave particular attention to the high ambient temperatures and high voltage transients which are experienced on locomotives.

Field currents in locomotive auxiliary generators of the same nominal voltage (75 volts) vary from 0.4 amp minimum to 13 amp maximum. Maximum continous armature currents vary from 30 to 350 amp.

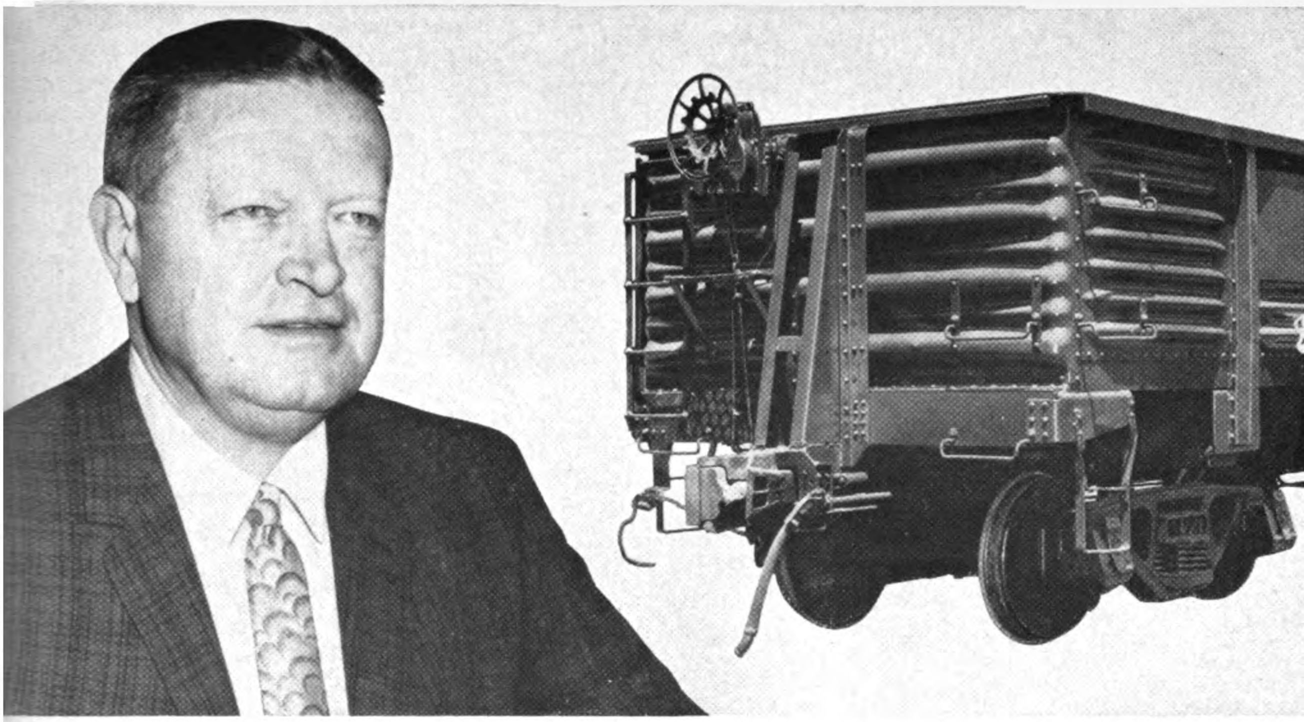
Regulator design must consider the environment in which it operates:

- Locomotive temperatures ranging from minus 30 to over 200 deg;
- Dirt, moisture, and their combined effects;
- Vibrations of widely variable frequencies and amplitudes;
- Megger voltages of 1,000 volts;
- High voltage transients in the control system.

Incorporating these criteria, it has been possible to design a family voltage regulators which are adequa for the voltages, field currents, spee and kilowatt ratings of the auxilia generators used on today's dies electric locomotives. All have t same arrangement, with the maj components indicated on the bas voltage regulator schematic diagra

In this basic diagram Transisto TR2 and TR3 are the generator fie control elements. In the conducti state they connect the output of t generator armature to the field. In t non-conducting state the field is di connected from the generator. TR is slaved to TR2 so that both transi tors operate simultaneously, shari equally the generator voltage.

The base drive of TR2 is from ge erator positive through rectifier RT emitter-base connection of TR2, a resistor R3 to generator negative. T combination of RT1 and emitter ba connection of TR2 is shunted by t emitter-collector connection of TR The base drive of TR1 is from ge



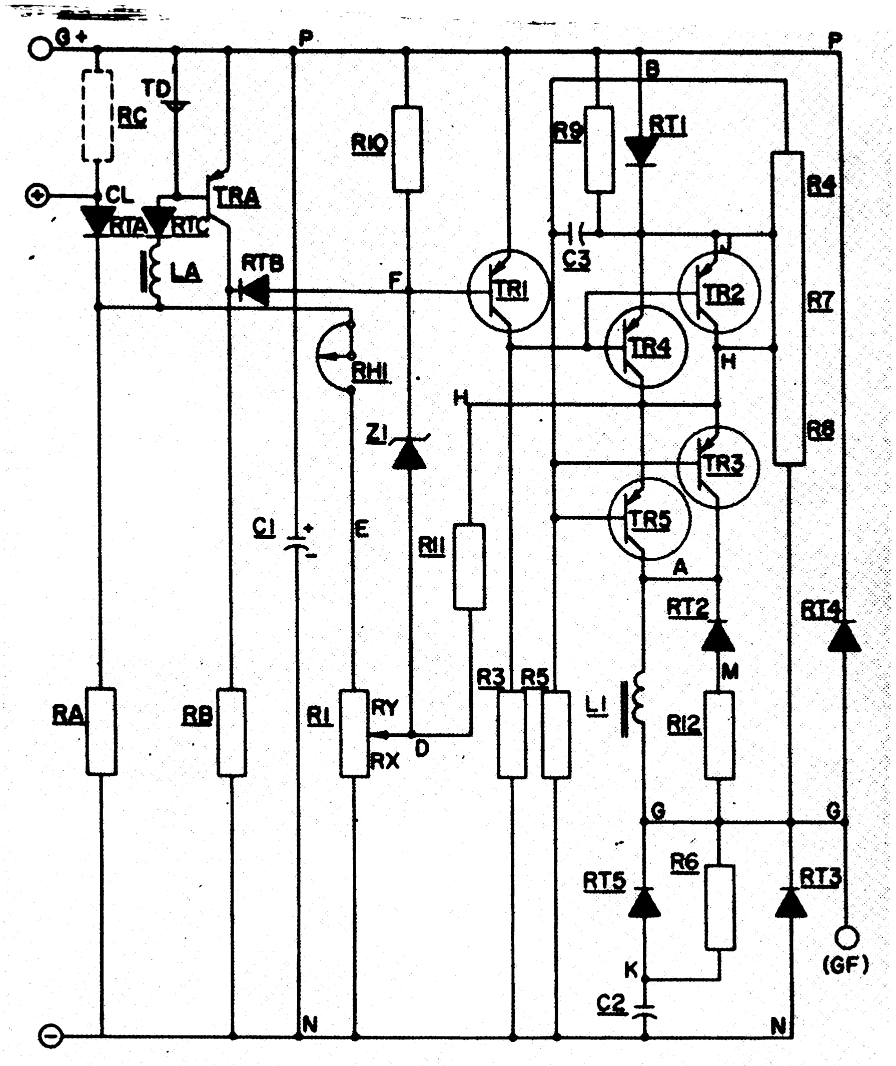
ator positive through the emitter ise connection of TR1, through Zen- diode Z1 and from the tap of R1 ick to generator negative. Connect- l to the generator output terminals, ltage divider resistors RH1 and R1 oportion the generator voltage so at at the preselected voltage to be gulated, the voltage across Zener Z1 aches a point slightly above the Zen- voltage breakdown knee. At a volt- e slightly below the preselected sys- m voltage, the current flow in the ner diode is insufficient to cause an preciable current flow from emitter- llector in TR1.

The voltage across R3 is nearly gen- ator voltage under all conditions, d with small current flowing from R1, the majority of R3 current is m the base of TR2. The base cur- nt in TR2 is sufficiently high to satu- te TR2 and TR3 will saturate by ive action. The generator, with the unt field connected to the armature, comes a self-excited machine. The tremely low saturation voltages of R2 and TR3 allow sufficient forcing ltage to be applied to the field, and output voltage rises at a rate deter- ned by the speed and the connected id, as well as the electrical design nstants of the machine.

A voltage slightly above the pre- ected system voltage will cause suf- ient Zener diode current and transis- TR1 base current to drive TR1 o full conduction. The voltage m emitter to collector of TR1 will extremely low and with the voltage p in rectifier RT1 back biases TR2, that TR2 cannot conduct and no d current can be supplied through nsistors TR2 and TR3. The field rent decays through rectifier RT3 l the voltage under these conditions reduced until it again reaches a tage at which the transistors again iduct and the cycle is repeated.

Although described as switching nsistors, the circuitry could possibly rate the transistor TR2 in the un- rated region with high power dis- ation and consequent overheating l breakdown. Feedback resistor 1 connected from the collector of 2 to the Zener diode Z1 insures t the transistors will switch from fully on to the fully off condition.

The field current required by any ticular machine has a maximum to imum ratio of approximately five, ough some applications, where the erator is operating well out on the ration curve, may have a maxi-



Complete wiring diagram for F-M regulator includes series of transistors and diodes.

mum to minimum field current ratio in excess of 10. The field voltage ratios under these conditions will be slightly in excess of field current ratios due to heating of the field. To affect these field voltage ratios, a form of pulse ratio modulation is used, differing from both pulse width modulation and pulse frequency modulation in that both frequency and pulse width vary.

To control minimum field currents, resistors R7 and R8 are equal to insure nearly equal voltage of TR2(TR4) and TR3(TR5) in the "off" condition. Also in the "off" condition, rectifier RT1 and resistors R7 and R8 form a series circuit essentially connected to the generator output. The current in this circuit aids in assuring that RT1 will have a voltage developed across its terminals although the transistors are in the cut-off condition. The voltage across RT1 in conjunction with the low emitter to collector voltage drop of TR1 back biases TR2 and TR4 transistors. TR3 and TR5 transistors are back biased by slave action.

Reliable operation at high temperatures and with low field currents can be obtained by proper selection of transistors.

Where switching circuits are used to control highly inductive loads in d-c circuits, the breakdown voltages are critical. Precautions must be taken to insure operation without excessive voltages.

Ambient temperatures from 115 to over 200 deg F have been measured at selected voltage regulator locations in a number of locomotives. These high operating temperatures demand a minimum temperature rise from ambient to transistor junction as well as consideration as to regulator location.

It is sometimes advantageous to provide a limiting or regulating means such that the maximum continuous armature current of the generator cannot be exceeded, but can be maintained. The current limit control incorporates a tunnel diode-transistor hybrid circuit. Using the peak current point of the tunnel diode as a reference signal and providing appropriate bias allows regulation of a small signal voltage. By developing this signal voltage across a small armature resist-

or current control is accomplished.

Rectifier RTA and series resis RA in the general schematic are co nected across the output terminals the generator. RTA is used above t knee of the rectifier forward characti istic curve and is a sufficiently accur bias. Resistor RC is the armature cu rent measuring means and EA is t voltage difference between the volta developed across RTA and across R

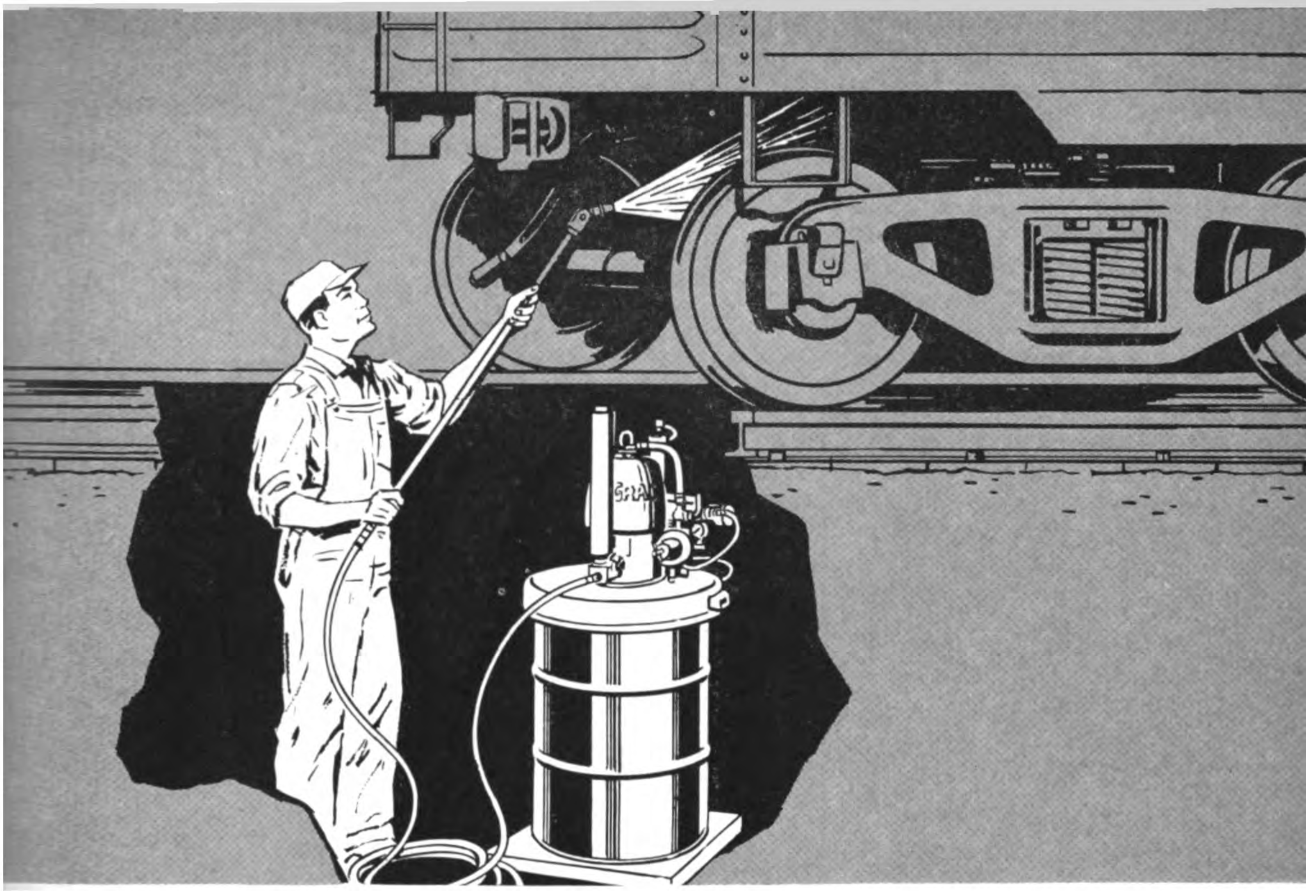
When the current in the RC resist is lower than a predetermined val transistor TRA conducts through sistor RB and biases the collector TRA with respect to the base of T so that no significant current can fl through RTB. TRI can still condu but only through the Zener diode Z and therefore can operate in volta regulation.

An increase in RC current above preset value places TRA in non-co duction forward biasing RTB a allowing TRI to conduct. Field cu rent is reduced through regulati circuitry previously described a armature current must necessarily r duce. Armature current reduction i creases EA and returns TR2(TR and TR3(TR5) to the conducti state. To control the frequency switching, inductor LA is employe

C1 capacitor is connected acro the terminals of the voltage regulat Any low energy voltage transients d to control circuit switching are effe tively suppressed by this capacitor.

A single voltage regulator usi power transistors in the switchi mode with the following design fe tures can be successfully used for reg lation of auxiliary generators in loc motive service:

- Steady state boundary conditio for maximum and minimum values regulated field current are determin
- Maximum continuous ambie temperature with maximum rated fie current, determined by compone other than transistors, is 185 deg F;
- Pulse ratio modulation is us to maintain field current at the desi level. Switching frequency is a fun tion of the generator, its speed and t connected load. Duty ratio is dete mined by the required field current
- Maximum peak power pulses the transistors are kept well below t maximum allowed by delaying curre build-up during "turn on" and by d laying field voltage collapse duri "turn off."
- Voltage transients of low ener are suppressed at regulator termina



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From the Diesel Maintainer's Note Book

Match Those Traction Motors; It's Important!

By Gordon Taylor

The intercom at Centerville diesel shop was calling for Doc Watts just as he walked into his office. It was a call from the service track asking for his help. A diesel trailing unit would not respond properly to reverser control from the lead unit. The unit wanted to pull against the lead unit instead of moving in the same direction. "I'll be right out," said Doc as he picked up his hat and dashed from the office.

At the service track he was met by Maintainer Pat Brown. "We're making up a three-unit locomotive with these GP9's for an extra west; yard office wants it in a hurry. Things were going fine until we found the middle unit was balky. Tried everything we could think of. Why we even tried operating with the unit at the other end as a control unit."

"What did you find?" asked Doc.

"Believe it or not," Pat replied, "The balky center unit acted OK, but the unit at this end was balky. It wanted to run in the opposite direction. There seems to be some sort of feud between those two units; they just do not want to work together. There must be something terribly mixed up in the control wiring on these units," he concluded.

"I can't agree that there is something wrong with the wiring *on* these units," responded Doc. "They have been working OK and there has been no work done on the wiring of either unit. I'd be inclined to think that you're using an improperly wired jumper cable between these two."

"I can't buy that," said Pat; it's a brand new one that I just got from the storeroom."

"Did you check it on the jumper test rack?"

"No," replied Pat. "It was brand new; I thought it was bound to be good."

"You know that the Number 8, FO, wire and the Number 9, REV, wires are supposed to be crossed between the plug terminals at the ends of the jumper. All wires *except* 'FOR' and REV wires run between corresponding terminals on the plugs at the two ends of the cable.

"The 8 and 9 wires in the trunk cable through the unit are also interchanged at the front jumper receptacles. Interchanging the Forward and Reverse control wires insures that all units connected together will operate in the same direction, regardless of whether they are running with the front ends forward or rear ends forward. Let's replace that new jumper cable and see what happens."

When the jumper cable was replaced, the trouble disappeared and all units pulled together. "Now," said Doc, "take this new cable into the shop and interchange the 8 and 9 wires in the plug at one end. I don't know why we would get into this difficulty with a brand new jumper, but we did."

"Thanks for getting me out of this," said Pat. "I don't see how you spotted the cause so quickly."

"It was because you gave me the best possible clue when you told me what happened as you tested the controls from the unit at the other end. The trouble almost had to be in the jumper cable.

"I do have some news for you, though. The trouble was not confine to the middle unit; it was showing u on both trailing units when you fir started to check the locomotive. An time you have a jumper cable improp erly wired in this way, all of th trailing units behind that jumper wi be trying to run in the wrong direc tion."

"I guess the hot weather and th heat being put on me by the yard offic really had me confused," replied Pa

"Now I must get back into th shop," Doc muttered as he turne away. "I saw something when I wa coming out here that needs to b checked."

Doc went to where some spar traction motors were being cleane and prepared for service. As he ap proached, he saw a motor suspende by a lifting cable and about to be low ered into a spare truck.

"Just a minute, fellow," Doc calle "Let's talk about what you're doin here. That motor looks like it ha been thoroughly cleaned, but wha model is it?"

"It's a D27," replied Tom Martir "We just gave it a general cleanin and test; we understood we were t install it in this spare truck."

"What kind of motor is alread mounted on the truck?" asked Do

"I'll check the data plate."

After looking, Tom answered, "It a Model D47."

"Well that changes things a bit. W cannot put a D27 motor with a D4 motor unless we know the truck wi be used on a unit with a 1,500-h power plant, like a GP7 or F7.

"A D47 motor is OK for a GP9 with a 2,000-hp engine. If we use tha D27 motor on a unit with a powe

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

Mr. M. I. Dunn, Senior Vice President, The Chesapeake and Ohio Railway Company

plant of 1,750-hp or higher, we'll overheat the motor and damage it. Until these older motors are upgraded, we'll have to confine them to the units for which they were built.

"As the builder produced locomotive units with more powerful engines, traction motors were improved to handle the higher output. This was done without increasing overall dimensions. Consequently, the higher horsepower motors will fit in the same space occupied by the older lower-horsepower motors. For this reason, we must be careful not to team lower horsepower motors with those of higher capacity, or we'll have an epidemic of roasted traction motors. For the present, we'll store that D27 until we find use for it on a 1,500-hp unit.

"Always remember that heating effect in a motor increases as the square of the current it carries. If you double the current, heating will not be doubled but, instead, will be four times greater. That is why it is so important to install properly matched traction motors on the units for which they were designed.

"While we're talking about traction motors, I notice some motor brushes over there which are immersed in a solvent cleaning solution. That practice must stop. Many solvents, especially those containing chlorine, are damaging to the film-forming and friction qualities of carbon brushes. That smooth, and much desired film that forms on commutator surface is the result of using properly designed brushes.

"Brush manufacturers include some materials in their brushes to reduce friction or improve film-forming properties, or both. Brushes should be cleaned by wiping with a cloth that has been dampened with a suitable cleaner, rather than left to soak in a cleaning solution.

"There are times when it is impossible to clean traction motors without solvents. In that case, remove the brushes from the holders and take them out of the motors to prevent their coming in contact with the solvent."

At this point Apprentice Bill New spoke up. "Doc, will you tell me an easy-to-remember rule for the relation of polarity between traction-motor main poles and interpoles?"

"Well," said Doc, "when you're checking with a compass in the direction of motor's rotation, you'll find a 'North' interpole is followed by a North main pole. Of course, a 'South' interpole will be followed by a South main pole."

"But what happens when you reverse the direction of rotation of the motor?" asked Bill.

"That's simple," said Doc. "To reverse the rotation, you have to reverse the polarity of all the main field poles, but do not change the polarity of the interpoles. But remember the direction of rotation of the motor armature has been reversed, so, when testing in *that direction*, it still leaves North interpoles being followed by North main poles. The polarity of the interpoles, once established, does not change regardless of the direction of rotation.

"While you are trying to get that polarity rule fixed in your mind, remember that, for generators, the polarities of interpoles are just the opposite of those of motors. In a generator a North main pole is followed by a North interpole when checking in direction of rotation. In other words, the main pole leads the interpole of the same polarity in a generator."

"I have one more question," said Bill. "It's related to the new GP30's we're getting. It is those silicon rectifiers that have me mystified. Maybe we could keep it simple by talking about the alternator on my car. It keeps the 12-volt battery charged by feeding it through silicon rectifiers. What I want to know is how many a-c volts are fed to the rectifier so it will deliver 12 volts direct current to the battery."

"That's quite a question," said Doc. "The alternator is a three-phase generator which supplies current through six rectifiers assembled for full-wave rectification. Full-wave rectification of an a-c voltage always produces a higher d-c voltage. In other words, 8 volts of a-c fed to a silicon rectifier can end up as 10 volts d-c. This does not trouble the alternator manufacturer. He simply sets the alternator to produce the proper a-c voltage so it will come out as 12 volts d-c.

"In considering the voltage produced by an alternator, we have two principal values to consider. They are the 'effective voltage' and the 'maximum voltage.' In alternating current during each cycle all possible voltage values between zero and maximum occur. The one in which we are chiefly interested is the effective voltage. Effective voltage is the value indicated by the voltmeter in an a-c circuit. The effective value of an alternating current is defined as that value which will produce the same heating effect as will the equivalent direct current. Because an alternating current or voltage is continually changing within a certain range, we consider only the effective value indicated by the meters.

"The effective voltage value is .707 times the maximum value. Stated in another way, the maximum value is 1.41 times the effective value. From this, you can see that the maximum voltage, while existing for just a fraction of a cycle, produces the extra push that makes it possible for the a-c voltage to produce a higher d-c voltage when fed through a full-wave rectifier.

"We all must get back to our jobs now, but we will discuss those rectifiers at another time."

Personal Mention

gin, Joliet & Eastern.—*Joliet, Ill.:* ULIS O. EED appointed repair track and derrick reman.

inois Central. — *Paducah, Ky.:* HUGH B. ERRIN appointed master mechanic, succeding R. E. WHITTAKER, deceased. *Memis, Tenn.:* NORMAN LAHNDORFF appointed sistant master mechanic, succeeding Mr. errin. *Vicksburg, Miss.:* WILLIAM H. EBER appointed assistant master mechan-, succeeding Mr. Lahndorff. Mr. Weber rmerly roundhouse foreman, McComb, iss.

ew York Central. — *New York:* A. J. RIENO appointed superintendent air akes and steam heat equipment, succeedg J. H. RUSSELL, on leave of absence with e Interstate Commerce Commission.

ckel Plate.—*Bison Yard, N.Y.:* H. C. MMERS appointed general car foreman. *rankfort, Ind.:* C. E. LITTLE appointed ad foreman of engines. *Huron, Ohio:* J. POLSO appointed car foreman.

orfolk & Western.—*Roanoke, Va.:* JACKSON PETTREY appointed assistant foreman, comotive department, Shaffers Crossing, cceeding LUTHER C. COLEMAN, deceased. *ienandoah, Va.:* CARL F. KRIPPENDORF pointed foreman, succeeding Mr. Pettrey. *orfolk, Va.:* W. E. HARMAN, general forean, Lamberts Point shop, retired. *Crewe, a.:* L. F. POPP appointed road foreman of gines, succeeding C. W. LEWEY, now ainmaster, Scioto Division.

nta Fe.—*Topeka, Kan.:* H. V. GILL apinted to the new position of works maner - Topeka shops. M. B. ADAMS apinted superintendent of shops, succeeding r. Gill. Mr. Adams formerly trainmaster Temple, Tex. *Amarillo, Tex.:* EARL E. EYNOLDS appointed assistant supervisor of r brakes, succeeding CECIL H. RAY, reed. Mr. Reynolds formerly road foreman engines at Shopton, Iowa.

o Line.—*Bismarck, N.D.:* E. J. LACOE apinted locomotive and car foreman.

uthern Pacific.—*Roseville, Calif.:* C. M. OOD appointed master car repairer, Sacraento Division. *Ogden, Utah:* K. C. VINN appointed master car repairer, Salt ake Division. *Los Angeles, Calif.:* E. J. IL appointed assistant master mechanic, s Angeles division, with headquarters at aylor Yard.

OBITUARY

H. H. Lanning, retired mechanical engiter, Santa Fe, died September 22 at Toka, Kan.

V. R. Hawthorne, who retired on December 1, 1955, as executive vice chairman, AAR lechanical Division, died October 18 in cksonville, Fla. Mr. Hawthorne was apointed acting secretary of the Master Car uilders and the American Railway Master lechanics Associations in 1918. From 919 to 1940 he was secretary of the Mehanical Division and, in 1941, became excutive vice chairman.

Supply Trade

W. F. Lewis
Alco

H. A. Correa
ACF

ALCO PRODUCTS, INC. — *William Lewis,* executive vice-president, elec president and chief operating officer, s ceeding *William G. Miller,* now chairm and chief executive officer.

ACF INDUSTRIES.—Functions and sponsibilities of American Car & Foun and Shippers' Car Line divisions chang effective November 1, 1963. Shippers' di sion will handle all sales to railroads and dustry of cars and related products, and w continue to have responsibility for car le ing and repair plants. American Car Foundry division, of which *Francis H. l land* is general manager, will control ma facturing and be responsible for engineeri and resarch. *John S. Carlson,* director sales, Shippers Car Line, becomes gene manager of division, succeeding *Henry Bootes,* retired. Both divisions will report executive department through *Henry Correa,* vice president-marketing, who been named vice president, executive partment. *John F. Burditt* also elected v president, executive department, is resp sible for finance, real estate, acquisitio advertising, public relations, and fore relations.

WESTINGHOUSE AIR BRAKE DIV *R. W. Ayres, Jr.,* appointed vice preside marketing.

L'ORANGE, G MB H. — *Korody Mar Corp.* of Hawthorne, Calif., named exc sive authorized service center in the U for the Maybach MD diesel injector syst manufactured by L'Orange of Stuttg West Germany.

HUCK MANUFACTURING CO. — *seph E. McKenna* appointed vice presid of marketing.

MONTREAL LOCOMOTIVE WORKS *I. I. Sylvester* appointed West Coast rep sentative at Vancouver, B.C.

CHEMETRON CORP. — *John L. Ad* elected president, succeeding James Dunham, deceased.

CRUCIBLE STEEL CO. OF AMERIC —*John J. Bollinger,* Midwestern sales r resentative, Spring Division, named sa manager of division, succeeding *John Wagg,* now general manager, Spring Di sion.

LANTIC RAILROAD SUPPLY CO.—
A. Corley, D. W. Hallberg, and *Orville rk* have formed Atlantic Railroad Sup- Co. to represent railway supply com- ies serving all departments of the rail- l industry. Headquarters, 24 Commerce Newark, N. J.

ONITE CO.—*Frank R. Postma,* sales esentative, Detroit sales office, named rict manager, Detroit sales territory. *ph R. Happley,* sales representative, St. is office, transferred to Minneapolis e.

LLMAN - STANDARD. — *James E. hcart* appointed assistant to vice presi- - marketing, Pullman-Standard Divi- l.

MBLE OIL & REFINING CO.—*J. K. ieson,* executive vice president, elected ident, succeeding *Carl E. Reistle, Jr.,* chairman of the board and chief execu- officer.

ECTRIC STORAGE BATTERY CO.— *vard A. Holland,* New York district iager, Exide Industrial Marketing Div., ointed northeast region manager, New k, succeeding *H. H. Warren,* who has red.

IKEN ROLLER BEARING CO. — *es W. Pilz* named director - sales, suc- ding *R. G. Wingerter,* resigned.

IO BRASS CO.—New York office ved to Woolworth Building 233 Broad- , New York.

Trade Publications

(To obtain copies of publications, circle corresponding numbers on card following page 46.)

68. INSPECTION KITS. Six-page brochure describes Tracer-Tech line of fluorescent and dye penetrant inspection kits and materials. Covers also use of penetrant materials as leak tracers. Uresco, Inc.

69. SCREWS. Flanged Hex Head Screw Bulletin gives up-to-date information on fasteners designed for high-cycle assembly operations. Screw and Bolt Corp. of America.

70. WELDING AND CUTTING TORCHES. 52-page catalog describes all welding and cutting torches, tips, outfits and accessory items in Airco line of oxy-fuel welding and cutting torches. A chart facilitates the selection of the equipment best suited to a particular job. Air Reduction Sales Co.

71. AIR COMPRESSORS. Catalog AC-1 describes complete line of Binks air compressors and accessories, with specifications on air and water-cooled compressors and electric and gas-driven portable units. Selector charts also included for rapid determination of size and type compressor needed for most common air-operated devices. Binks Manufacturing Co.

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